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JOHN L. FARLEY, DIRECTOR



COMMERCIAL FISHERIES REVIEW



A review of developments and news of the fishery industries prepared in the BRANCH OF COMMERCIAL FISHERIES

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Mailed free to members of the fishery and allied industries. Address correspondence and requests to the: Director, Fish and Wildlife Service, U.S. Department of the Interior, Washington 25, D.C.

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CORRECTION: April 1956 issue: The Japanese fishing vessels reproduced on the front cover page and on page 34, labeled Kuroshio No. 21, are labeled incorrectly. The photograph on the cover page is the Bocho Maru No. 1 and that on page 34 is the Shirogami Maru No. 1, according to advice received from Japan.

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COMMERCIAL FISHERIES REVIEW

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COMPOSITION OF SOUTHERN OYSTERS

By Charles F. Lee* and Leonard Pepper**

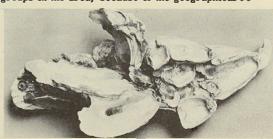
ABSTRACT

Southern oysters collected from plants along the South Atlantic and Gulf Coasts have been analyzed for dry matter, protein, fat, mineral matter, and salt. The carbohydrate content was calculated by difference, During the period from October 1954 to October 1955 inclusive, 58 sample pairs were collected, each consisting of a sample of oysters taken at the plant directly from the same lot of oysters, and a sample of the regularly shucked and washed commercial product from the same lot of oysters. It was found that the dry matter, fat, and carbohydrate content of the "shell" samples all changed in a similar manner during the season. Minimum values for monthly averages were observed for September and October and maximum values for April or May. This had been expected because of the relationship of these constituents to the spawning cycle; however, no explantion is apparent for a very similar fluctuation in the mineral matter and salt content of these oysters. Comparisons of all data have been made on a dry-weight basis, When the data for "plant" and "shell" samples were averaged by states, the values for constituents of the "plant" sarpling the values for constituents of the "plant" samples were averaged by states, the values for constituents of the "plant" samples were averaged by states, the values for constituents of the "plant" seasonal fluctuation masks the relatively minor effects of factors such as differences in plant practices and location. This study of composition of the Southern oyster is being continued for a second year,

BACKGROUND

Technological investigation and research on the Southern oyster was started in October 1954 with funds provided by Public Law 466 (Saltonstall-Kennedy Act of 1954). It was thought desirable to conduct most of the research through contracts with qualified and interested groups in the area, because of the geographical re-

moteness of the Fish and Wildlife Service's nearest technological laboratory from the Gulf Coast and because of the highly perishable nature of the product. Staff members of the Service's Fishery Technological Laboratory at College Park, Md., were assigned to do the proximate analyses of ovsters and keep close liaison with the contractors. Contracts were negotiated with three Southern universities during February 1955, Staff



A cluster of South Atlantic oysters.

workers of the College Park Laboratory maintained fiaison among the several groups, sponsored joint project conferences, and assisted in any way possible to facilitate research.

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FACTORS AFFECTING STORAGE OF RAW SHUCKED OYSTERS

Dr. E. A. Fieger and staff at Louisiana State University in Baton Rouge, La., contracted to investigate factors affecting frozen storage of raw shucked oysters. The first year in storage has been completed for the first lot of oysters; these were packed in May 1955. The results of this storage test will be reported shortly.

Since January 1956, when Southern oysters in good condition were available again, four new packs of oysters for frozen storage have been prepared: two from Louisiana, one from Bon Secour, Ala., and one from Mississippi. Storage tests should demonstrate whether factors related to the season of catch, location of beds, and methods of handling in the plant affect the quality of the frozen pack.

Dr. Fieger and his staff have also studied changes during iced storage of two lots of fresh oysters as commercially shucked and washed. The data from these tests should show, to some extent, the effect on quality and storage life, when iced, of oysters produced by the different methods of shucking and washing used by the various plants in this area.

DEVELOPMENT OF NEW COOKED SOUTHERN OYSTER PRODUCTS

A second contract was allotted to Florida State University in Tallahassee, Fla. Dr. Betty M. Watts and her staff of the School of Home Economics are primarily concerned with the development of new cooked Southern oyster products for frozen storage, such as stews, soups, scalloped oysters, and other casserole-type dishes

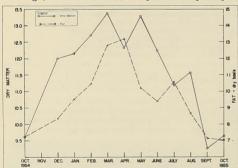


Fig. 1 - Average dry matter and fat content, dry-weight basis, of "shell" oysters according to month samples were collected.

in which the juices contribute flavor and nutritional value. Frozen products of this type involve a great deal of developmental research, and the problem has been complicated by the short season (January to April) during which good commercial oysters are available locally. However, encouraging progress has been made and it is expected that this program will be expanded considerably during the coming season.

Four separate reports on results of the work during the first contract year will be published by the group at Florida State University. The first on changes during storage of cooked oysters has been

been submitted to <u>Food Technology</u>, and the second, on the relation of pH to quality of shucked oysters will be published in <u>Commercial Fisheries Review</u>. Reports are also in preparation on seasonal changes in total solids, niacin, and riboflavin content of the local oysters, and on the results of irradiation of oysters with Cobalt 60.

BODY-FLUID BALANCE AND DISCOLORATION IN SOUTHERN OYSTERS

Dr. Milton Fingerman at Tulane University in New Orleans has the third contract for some basic physiological research concerned with the body-fluid balance in live Southern oysters.

The results of Dr. Fingerman's initial research have been published in <u>Tulane</u> Studies in Zoology, vol. 3, no. 9, April 12, 1956. This research is continuing,

and will include during the second year a more extensive study of the internal sources of these fluids and the body mechanism that regulates their composition. Also under investigation are the causes of the brown or blackish discoloration that is observed in oysters from certain production areas. This discoloration has been the subject, in the past, of much speculation as to origin but little investigation, and the present work has mainly proven that most of the previously advanced explanations have little basis in fact. A preliminary report of this phase of their research will appear in Commercial Fisheries Review.

SEASONAL VARIABILITY IN COMPOSITION OF OYSTERS

Providing data on seasonal variability in compostion of the oysters from the numerous producing areas in the South is a second function of the Service's College Park Fishery Technological Laboratory. Contractors have, for the most part, used local oysters for their storage tests and other phases of their research. Knowledge of the effect of seasonal and geographical factors on the composition of the Southern oyster is needed to extend the applicability of the results of these research projects, since virtually no information on this subject is available in the literature. Samples collected throughout the area have been analyzed for dry matter, crude protein, fat, mineral matter, and salt. The carbohydrate content has been calculated by difference. All of these constituents vary markedly and the data serve adequately to demonstrate seasonal differences and variations due to location.

<u>COLLECTION OF SAMPLES:</u> The method of sampling raw shucked oysters is of importance because of the very rapid loss in body fluids and the resulting change in composition that occurs within minutes after shucking (Fingerman 1956). For the desired comparisons of season and area, plant samples were of little value since

there were also large salt and fluid losses in the shucking bucket and in washing the shucked meats. Thus, for these comparisons, it was necessary to obtain samples shucked directly from the shell into a sample can at the plant by one of the regular oyster shuckers. These samples were difficult to obtain because shucking operations are irregular everywhere on the South Atlantic and Gulf Coasts except in New Orleans, being limited to 3- or 4hour periods once or twice each week during much of the season.



Fig. 2 - Average protein and carbohydrate content, dry-weight basis, of "shell" oysters according to month samples were collected,

Whenever a "shell" sample could be obtained, a comparable "plant" sample was also collected from the same lot of oysters that had been shucked in the usual manner, and drained and washed on the skimmer according to the usual plant practice. This permitted a comparison of the commercial product from various plants and, more specifically, a comparison of the effect of the different handling methods on the composition of the washed product. Because of the large differences in dry-matter content of these samples, the data have been converted to a dry basis for better comparison.

ANALYSIS OF DATA: The data for all constituents of the "shell" samples have been averaged by months to determine the extent of seasonal effect on composition (figs. 1, 2, and 3), and the same data for both "shell" and "plant" samples have been averaged for each state (table 1) to determine whether differences exist between oysters from the several states.

The data for the "shell" samples according to month of collection are summarized in figures 1, 2, and 3. Because of the difficulty in obtaining the "shell" samples, none of the monthly averages includes data for all six states that would be desirable for maximum significance. This results in a considerable range in the number of values for each month; from 11 for October 1954 to only 2 for the months from May through August 1955, when shucking has stopped in most areas. The summer samples were all collected from New Orleans plants by the staff of Louisiana State University.

The first samples were obtained in October 1954, and the figures include the period through October 1955 with data for all months except for November 1954. The change in composition, usually associated with the advancing season (the "R" months), is an improvement in the condition of the oyster after the summer spawning period. In the South the spawning period is much longer than in colder climates.

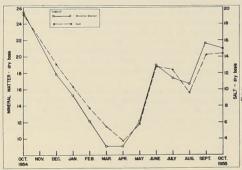


Fig. 3 - Average mineral matter and salt content, dry-weight basis, of "shell" oysters according to month samples were collected.

and ovsters are thin and in poor condition for a somewhat longer period, extending well into the fall months. The data in figures 1 and 2 show the very definite increase in dry matter, fat, and carbohydrates that occurred from October to March. Oysters were in good condition from March through May when judged on the basis of dry matter and carbohydrates, although the fat content had already decreased markedly by May. All three constituents were found in decreasing quantities during the summer, with the lowest values for each in September. Dry matter and fat had not changed in October but the carbohydrate content had increased slightly.

There appears to be a definite inverse relationship between the protein and the carbohydrate contents as indicated in figure 2. The protein content decreased to a minimum in May, when other constitutents were at the seasonal maximum, then increased sharply to a high value in August. The data in figure 2 show that the direction of changes in protein content is exactly opposite to that of the carbohydrate content for every month except the short period from December to February, when both constituents increased slightly. Actually, the protein content is probably least subject to change of all constituents, but as fat and carbohydrate contents decrease, the protein makes up a greater proportion of the remaining body tissue percentagewise.

The data in figure 3 show a surprisingly consistent decrease in mineral matter and in salt from October to April. Thereafter there was a fairly regular increase in these constituents until September, with values for September and October being only slightly lower than the high values found in October 1954. The explanation for the fluctuation in salt and the positively-correlated changes in mineral matter content is not known. This might reasonably be assumed to be related to the salinity of the water from which the oysters were taken. Information on this variable is not available but salinity would hardly be expected to show as uniform a cycle of change as is indicated by the data in figure 3, especially since a considerable and variable number of different and widely-scattered areas are represented in the monthly averages.

The data in table 1 show that the ranges for maximum and minimum values for the six constituents are quite large in many instances. This is almost entirely due to the seasonal variation already demonstrated. Although the oyster samples were not always obtained from the same plant each month, and oysters were often from

	Table 1 - Data on the Composition of the Shell and the Plant Samples of Southern Oysters from October 1954 to October 1955 Inclusive												
Table 1 - Data or			e Shell a	nd the Pl	ant Samp	les of So	uthern O			per 1954	to Octob	er 1955 In	clusive
	Number of		Dry Matter Protein Fat Mineral Matter Salt2/ Carbohydr										
State	Pairs of	Dry M										Carboh	
	Samples1/	"Plant"	"Shell"	"Plant"	Shell	Plant"				"Plant"	Shell	"Plant"	"Shell"
							. (Perc	ent)					
Louisiana: Maximum	29	18.1	17.1	74.8	63.5	14.7	1 16.7	17.1	35.9.	10.4	28.9	42.2	41.3
Minimum		5.9	6.9	40.9	36.8	6.8	5.6	4.6	6.4	1.1	2.8	7.1	8.1
Mean		11.2	11.5	56.0	51.3	11.0	10.1	9.8	16.5	4.6	10.8	23.1	22.3
		11.0	11.0	50,0	01.0	41.0	10.1	0.0	10.0	4.0	10.0	20.1	22.0
Mississippi:	5	17.0	14.5	00.0	58.7	12.7	11.3	14.1	24.1	5.5	16.2	41.7	35.7
Maximum Minimum		10.9	14.5 7.5	60.8 40.6	37.3	8.8	8.0	14.1 5.1	13.9	1.3	9.7	18.9	15.6
Mean		13.5	11.2	49.1	45.1	11.3	10.0	8.9	17.9	3.2	12.4	30.7	27.1
		15.5	11.2	40.1	40.1	11.0	10.0	0.0	11.5	0.2	14.7	30, 1	21.1
Alabama:	11	45.0	40.0		50.0	16.5	14.0	10.4	24.6	6.7	18.2	37.2	34.8
Maximum Minimum		15.2 7.0	13.6	60.1 43.8	56,8 42.1	8.7	14.6	12.4	5.5	0.7	2.2	16.5	13.0
Mean		12.6	11.8	50.7	50.0	12.5	11.0	7.5	12.1	3.1	7.2	29.3	27.9
		12,0	11.0	50.1	00.0	10.0	11.0	1.0	10.1	0.1	1.0	20.0	21.0
Florida:	6					10.0	40.5	40.0			00.4	05.	04.0
Maximum Minimum		17.5 9.9	12.3	61.4 45.0	52.8 40.8	13.5 7.6	10.5	18.3 8.6	30.3	10.1	22,4	35.4 13.3	34.8 12.3
Mean		13.5	10.8	51.5	46.6	10.1	7.4	13.6	22.9	7.9	17.2	24.9	23.0
		10.0	10.0	31.3	40.0	10.1	1, 2	10.0	22.0	1.0	11.5	24.0	20.0
Georgia:	2				40.0			45.0	05.0	11.0	01.0	07.0	00.0
Maximum Minimum		14.2 13.9	11.1	54.2 51.2	48.0 45.9	9.2	6.9	17.6 12.0	25.6 24.3	11.6 6.8	21.2 18.3	27.6 20.6	22.9
Mean		14.1	10.3	52.7	47.0	8.4	6.3	14.8	25.0	9.2	19.8	24.1	21.9
		14.1	10.1	34,1	41.0	0.4	0.3	14.0	20.0	0.4	10.0	24.1	21.0
South Carolina:	3												
Maximum		17.9	15.3	52.7	46.0	9.8	8.3	12.6 9.2	22.4	8.4	17.9	37.0	30.1
Minimum Mean		16.3 17.3	12.1	46.1 49.7	44.7 45.4	5.8 8.3	7.7	11.3	15.9 19.2	5.5 6.5	11.5 14.7	25.5 30.1	25.3
1/ Pairs consist of one s	ample of austons a								10.4	0.0	17.1	30.1	41.1
2/ Sodium chloride calcu	lated from chlorid	e content.	ay aroth the s	stream and the o	mer raken ir	om reguar pi	am products	n1.					

different growing areas even when the same plant was available as a sample source, the effect of these factors on the composition of the samples was largely masked by seasonal influences. Comparison of the averages for plant and shell samples in general show large differences only for mineral matter and salt.

<u>CONCLUSIONS</u>: Because of the large seasonal variation in all constituents, comparison between states of average values for the various constituents is hardly warranted. However, these averages, qualified by the data for individual sample pairs not shown in the table, seem to justify certain tentative conclusions, subject to confirmation from data for a second season:

- (1) Oysters in all areas studied conform in a general way to the same seasonal cycle of variability for each of the constituents measured.
- (2) The dry matter of most of the plant-washed samples is greater than for the comparable "shell" samples. This is a result of the usual practice of only washing the oysters on the skimmer with a spray nozzle, which gives a much shorter exposure to fresh water than occurs during blowing.
- (3) There is a loss of salt amounting to from 55 to 60 percent for the "plant" samples as compared with the "shell" samples. Most of this loss is probably in the liquor drained off on the skimmer.
- (4) The decrease in salt and in the mineral matter combined with the usual increase in dry matter results in an even larger apparent increase in protein and usually in carbohydrate for the "plant" samples as compared with similar values for the "shell" samples. These constituents are insoluble and thus constitute a greater proportion of the remaining solids.
- (5) There is a marked decrease in the saltiness of the oysters in all areasfrom October to March. By May the salt content is increasing toward a September maximum. The reasons for this unexpectedly large and apparently cyclic fluctuation

in salt are not known. No data on salinities of the water in producing areas are available to determine the effect of this factor upon the salt content of the oyster.

The factors affecting the composition of the oyster are so numerous that interpretation of data, even with the 116 samples included in this series, is unsatisfactory in many instances, due to the small number of values for any single constituent. Samples for analysis for the second season, that is, the period from October 1955 to April 1956, have already been collected. No solution has been found for the various problems involved in obtaining more complete sample series from certain problem areas. Efforts were made to obtain the desired samples at various selected locations through the cooperation of (1) a plant owner, (2) an employee in a Fish and Wildlife Service Wildlife Refuge located very near two oyster plants, (3) aU.S. Public Health Service official who regularly visited one producing area to obtain samples for his own work, and (4) one of the university groups with an oyster research contract. The results ranged from fair to failure; none supplied a satisfactory series of samples. Particular credit should, however, be given to Dr. Arthur Novak at Louisiana State University. Through his efforts, complete series are available for two plants in New Orleans and quite satisfactory coverage for several plants in Mississippi and Alabama. The plant owners contacted everywhere have been uniformly cooperative in supplying the type of samples desired if visited when shucking was in progress and this cooperation is deeply appreciated.

Sample collections will be continued through October 1956 to provide data for a second complete year. Because of the virtual impossibility of obtaining satisfactory coverage of the South Atlantic Coast, it is not expected at this time to try to sample the whole area for a third season, unless unexpected and inexplicable differences are found between the data of the first two years.

SUMMARY: Data for average proximate composition of 16 samples of oysters collected from producing areas from South Carolina to Louisiana are presented tabularly by States, and by the type of sample, either "shell" as shucked; or "plant," that is commercially drained and washed on the skimmer. The values for certain constituents of the "shell" samples have been averaged by months when collected. These data are included in figures 1, 2, and 3, and indicate the type of seasonal fluctuation found. Comparisons are made entirely on dry basis. In general, dry matter, fat carbohydrate, mineral matter, and salt were at seasonal maxima in April and May, while minimum values were found in September and October. An inverse relationship was found for the protein content, that is, a May minimum and an August maximum. The study of composition of Southern oysters is being continued for a second season.

BIBLIIOGRAPHY

- Osmotic Behavior and Bleeding of the Oyster, Crassostrea virginica, by Milton Fingerman and Laurence D, Fairbanks, Tulane Studies in Zoology, vol. 3, no. 9, April 1956, pp. 152-168.
- Some Factors Affecting Fluid Loss in Southern Oysters, by Milton Fingerman and Laurence D. Fairbanks. Commercial Fisheries Review, vol. 18, no. 1, January 1956, pp. 10-11 (also Sep. No. 426).
- Investigation of the Deterioration of Cooked Oysters, by Elizabeth Ann Gardner and Betty M. Watts. Submitted to Food Technology.
- Correlation of pH and Quality of Shucked Southern Oysters, by Elizabeth Ann Gardner and Betty M. Watts. Submitted for publication in Commercial Fisheries Review.
- "Brown-Spotting" in the Southern Oyster, by Milton Fingerman, Scheduled for publication in Commercial Fisheries Review, vol. 18, no. 8, August 1956,
- Rapid Procedures for Approximation of Bacterial Count in Shrimp and Oysters, by A. F. Novak, E. A. Fieger, and M. E. Bailey. Food Technology, vol. 10, no. 2, February 1956, pp. 66-67.
- 7. Composition of Southern Oysters, by Betty M. Watts to be published in Commercial Fisheries Review.



EXPLORATORY FISHING VESSEL GEORGE M. BOWERS

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Part I - Description of Vessel

By Reidar F. Sand*

INTRODUCTION

The U. S. Fish and Wildlife Service commissioned the George M. Bowers at Miami, Fla., on January 7, 1956. It was built by Steam Ways Corporation of Tampa, Fla., to Service design specifications, with funds provided by the Saltonstall-Kennedy Act of 1954. This vessel will be used primarily in the Service's gear research and development projects and will assist in the program to investigate the fishery resources of the South Atlantic area. The vessel is operated by the Exploratory Fishing and Gear Development Section of the Service's Branch of Commercial Fisheries.

The $\underline{\text{George}}\ \underline{\text{M}}$. $\underline{\text{Bowers}}$ will first participate in exploration for new commercial shrimp and fishing grounds in the South Atlantic off the coasts of Florida, Georgian for the south Atlantic off the coasts of Florida, Georgian for the south Atlantic off the coasts of Florida, Georgian for the south Atlantic off the coasts of Florida, Georgian for the south Atlantic off the coasts of Florida, Georgian for the south Atlantic off the coasts of Florida, Georgian for the south Atlantic off the coasts of Florida, Georgian for the south Atlantic off the coasts of Florida, Georgian for the south Atlantic off the coasts of Florida, Georgian for the south Atlantic off the coasts of Florida, Georgian for the south Atlantic off the coasts of Florida, Georgian for the south Atlantic off the coasts of Florida, Georgian for the south Atlantic off the coasts of Florida, Georgian for the south Atlantic off the coasts of Florida, Georgian for the south Atlantic off the coasts of Florida, Georgian for the south Atlantic off the coasts of Florida, Georgian for the south Atlantic off the coasts of Florida, Georgian for the south Atlantic off the coasts of Florida, Georgian for the south Atlantic of the south Atlantic off th

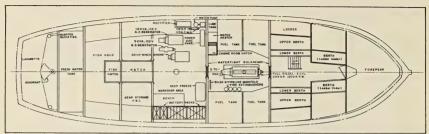
gia, North and South Carolina. Upon completion of this assignment the <u>George M. Bowers</u> will place emphasis on research in the field of fishing-gear development.

While substantially of shrimptrawler design common to the Gulf and South Atlantic area, the vessel is modified for operation as a multipurpose fishing vessel capable of trawling, trolling, seining, long-lining, gill-netting, and livebait fishing. Special equipment has been installed for research on fishing gear that is important to the commercial fisheries of the United States. For observing fishing gear in action, provisions have been made for installation of the Service's underwater television equipment. The vessel is equipped with a unique and versatile electrical system designed by Service technicians.

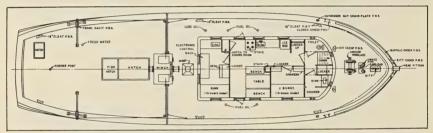


Fig. 1 - The George M. Bowers on a trial run.

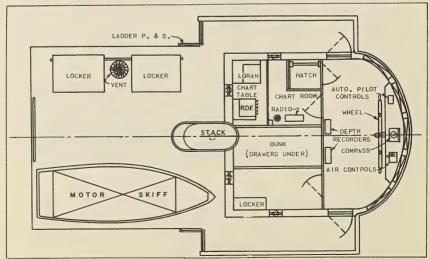
The plans for the <u>George M. Bowers</u> were based largely on practical experience gained from operating other Service exploratory fishing vessels, and its design includes provisions for adaptation to the future needs of experimental and exploratory fishing. The operating area will be from Cape Hatteras, N.C., to the <u>Gulf of Mexico and offshore waters</u>. For this reason the <u>George M. Bowers</u> is *Fishery Methods and Equipment Specialist, Gear Research Station, Exploratory Fishing and Gear Development Section, Branch of Commercial Fisheries, U, S. Fish and Wildlife Service, Coral Gables, Fla.



Hold Arrangement, Motorship George M. Bowers.



Main-Deck Arrangement.



Upper-Deck Arrangement,

strongly built, amply powered for a 5,000-mile cruising range, and equipped with the most modern navigational devices.

The vessel bears the name of the distinguished former United States Commissioner of Fisheries, George M. Bowers; he was Commissioner from 1898 to 1913, and in 1902-1903 was President of the American Fisheries Society. He was appointed to the House of Representatives from West Virginia in 1913 to fill an unexpired term and was re-elected, serving until 1923. Bowers died at Martinsburg, W. Va., December 7, 1925.

VESSEL SPECIFICATIONS

The vessel's construction is of wood with three transverse watertight bulkheads. Hull planking is of Douglas fir, and frames of oak are doubled and steam-bent. The deckhouse of cypress is standard double-side construction through-bolted to the deck. Interior deckhouse sheeting is of marine plywood. While the general design is that of the Florida shrimp trawler, there is considerable resemblance to the Pacific Coast combination seiner-trawler with deckhouse forward and clear deck space aft. To improve vessel handling qualities and trim under various fishing conditions, machinery spaces and tanks are disposed further aft than in conventional trawlers.

The vessel is built to the following dimensions:

Length over-all - 73 ft.

Beam over guards - 21 ft., 6 in.

Draft over keel - 7 ft., 6 in.

Diesel fuel capacity - 5,100 gals.

Fresh water capacity - 2,000 gals.
Lube oil capacity - 125 gals.
Cruising speed - 9.8 knots
Maximum speed - 10.2 knots.

Main propulsion power is supplied by a six-cylinder four-cycle Diesel engine built to American Bureau of Shipping Standards. The engine delivers 209 hp.

at 1,200 r.p.m. through 3:1 reduction gear to a 50 x 40 four-blade propeller. A sixcylinder 50 hp. Diesel auxiliary engine is designed to drive the main trawl winch through a fluid coupling equipped with clutch and reverse gear. A four-cylinder Diesel engine-driven generator supplies 10 kw. for the vessel's electrical system of 110 and 220 volts a.c., and 32 and 110 volts d.c. A smaller 3 kw. Diesel generator supplements the 10 kw. generator. A main engine-driven high-pressure closed impeller-type pump delivers 100 gallons a minute at 80 pounds a square inch for bilge pumping, fire, and washdown services. A smaller auxiliary engine-driven low-pressure pump delivers 40 gallons a minute. The engine-driven pumps are supplemented by a three-inch hand pump located on deck.

A 110-volt battery bank installed in the hold provides a quiet source of electrical power for underwater sound research on commercial species of fish. The vessel has a hold capacity for 10 tons of fish and ice because a large capacity was not thought to be necessary for experimental fisheries work.



Fig. 3 - View of George M. Bowers' main engine and CO₂ system.

Machinery spaces below decks are protected from fire by automatic and manuallyoperated CO₂ systems. Guards are installed over all items of machinery where exposed moving parts may cause injury to personnel. Deck machinery consists of an electrical motor-driven anchor windlass, and oceanographic winch, and a combination seine-trawl winch. The main double-drum trawl winch spools 500 fathoms of $\frac{7}{18}$ -inch cable on each drum and may be modified



Fig. 4 - After deck showing main trawl winch,

Fig. 5 - After deck view showing trawl davits, Trawling may be done either with these davits or with the "Floridatype" trawling boom,

in a short period of time for seining, and long-line and gill-net hauling. An air ram-operated emergency stop control is a special feature of the main trawl winch installation.

The George M. Bowers may be rigged with various types of specialized fishing equipment which are readily portable. Among these are trolling poles, a bait tank, gallows frames for both the Florida-type and stern-set trawling rigs. The



Fig. 6 - View of pilothouse showing wheel and engine controls.



Fig. 7 - View of sonic depth recorders in pilothouse and radio in chartroom,

vessel will also be outfitted with such hydrographic gear as bathythermographs, bottom-sampling devices, and reversing thermometers. A laboratory space with sink is provided in the after section of the deckhouse.

Electronic equipment aboard includes:

- 1. Sonic depth recorder, 0 200 fathoms
- 2. Sonic depth recorder, 0 700 fathoms
- 3. Radiotelephone, 70 watts
- 4. Radiotelephone, 75 watts
- 5. Radio-direction finder
- 6. Direct-reading loran receiver.

In addition to manual steering, the vessel is equipped with a nonhunting-type automatic pilot. An emergency tiller may be quickly attached with removal of a deck flange above the rudder post. In tests and trials the vessel exhibited fine qualities of maneuverability and seaworthiness. A separate chart and instrument room has been provided because of the need for these facilities. Quarters are provided for four scientists in addition to crew space for six.

Six berths are located in the forecastle, two in the deckhouse, and one in the laboratory space. Separate quarters are provided for the captain adjacent to the wheelhouse.

A desirable feature of the $\underline{\text{George }}\underline{\text{M}}.$ $\underline{\text{Bowers}}$ not usually found in fishing vessels of this size is the provision for inside access to working areas, quarters, and storage spaces. This provision for crew comfort is a definite advantage to the multipurpose fishing or exploratory vessel, and was accomplished without loss of space or special arrangements.

Part II - Vessel's Electrical and Auxiliary-Drive Systems

By Richard L. McNeely*

ELECTRICAL SYSTEM

The design of the electrical system of the <u>George M. Bowers</u> fulfills a variety of requirements and makes provision for future possible needs. Of particular note in the installation are features of economy both to the initial cost of the installation and to operational and maintenance expenses.

The larger of the generating plants is 110-volt a.c. single-phase and is rated at 10 kv.-a. The unique design and installation features of the system permits, without overload, intermittent operation of:

Galley range	00 watts
Thirty-gallon hot-water heater 110 v. a. c 1,800 watts	
Galley refrigerator	
Fourteen cu.ft. deep-freeze unit 110 v. a. c 100 watts	
Deck flood lights	
Deckhouse lighting and wiring circuits 110 v. a. c 250 watts	
The air compressor	
Battery-charging rectifiers110 v. a. c. to 110 v. d. c 500 watts	
Ventilation blower	
Fresh-water pump	
Anchor winch	
Navigational aids	

and other minor equipment.

Additional auxiliary power is furnished by a 3-kv.-a. 110 volt a.c. generator and 32-volt battery charger. The battery-charging unit is tapped off of a 32-volt generator field exciter.

The main propulsion engine drives one 1,500-watt 32-v. d.c generator and one 3,000-watt 110-v. d.c generator. A motor generator set allows power conversion * Electronics Specialist, Gear Research Station, Exploratory Fishing and Gear Development Section, Branch of Commercial Fisheries, U. S. Fish and Wildlife Service, Coral Gables, Fla.

to a.c. The electrical energy produced by the 3,000-watt generator is stored in a 110-volt bank of batteries. Principal use of the motor generator set is a source of emergency a.c. power and a quiet source of

All control switches in the 110 v. a.c. and 110 v. d.c. and 32 v. d.c. are of the circuit-breaker type. Plug-in receptacles for all three types of current are provided in the laboratory space and in the radio chartroom. Dissimilar types of plug-in prongs and receptacles prevent error in selection of power source.

The 32-volt system is used for engine cranking only to insure longer battery life. All engine-starting systems are isolated as

The 32-volt system is used for engine cranking only to insure longer battery life. All engine-starting systems are isolated as added protection against electrolysis. All major equipment is bonded with heavy-gauge copper wire and grounded to a keel-mounted grounding buss. Either 220-volt single-phase or 110-volt single-phase shore power may be introduced for ship supply. This is accomplished by means of one air-cooled 10 kv. a. 110-220 volt transformer. An isolation transformer removes shore power grounds from the system.

a.c. power required in underwater sound ex-



Fig. 8 - View of George M. Bowers Diesel auxiliaries.

gation lights due to a.c. power-plant failure, navigation lights are 110 volt d.c. A reserve of power in the 110-volt battery bank would allow from 5 to 10 days of operation without re-charging. With this

eration without re-charging. With this bank of batteries and a motor generator set, all 110-volt a.c. navigational equipment would be of service in emergencies. Of particular importance is the fact that this electrical system has been designed so that no switch on either the main or auxiliary distribution panels may be thrown in such a manner as to damage the electrical system or any of its equipments in any way.

WINCH-ENGINE AUXILIARY DRIVE

An unusual power take-off installation aboard the George $\underline{\mathbf{M}}$. Bowers allows a 50 hp. auxiliary Dieselengine to perform double duty.

This engine is equipped with clutch and reverse gear and by means of a fluid coupling-type torque converter provides power requirements in varying amounts for the combination deck winch.



Fig. 9 - View of power-distribution panel, showing 110 v. a.c., 110v. d.c., 32 v. d.c controls, and isolation transformer.

In numerous operations in fishery investigations, such as the towing of smaller nets, trolling, and underwater sound and television work, slower vessel speeds are

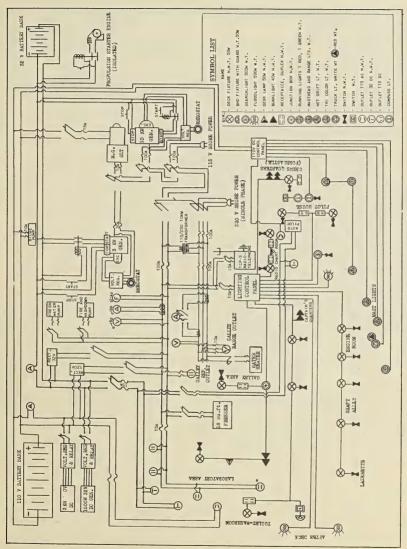


Fig. 10 - Diagram of George M. Bowers' electrical system,

required for extended periods of time. These slower speeds tend to foul larger engines and are not recommended practice.

The George M. Bowers is equipped with a sailing clutch between main engine and propeller shafting. By means of another chain drive take-off from the winch-



Fig. 11 - View of George M. Bowers' auxiliary drive,

air controls.

engine jack shaft to the main propeller shaft, the winch engine may be used as auxiliary engine power. Roller chain and sprocket drive from the winch engine turns the winch jack shafting at 192 r.p.m. A two-to-one reduction in the chain sprocket drive to the main shaft provides through the torque converter 0-96 turns a minute at the propeller. This gives the vessel a flexible range of speeds from $0-3\frac{1}{2}$ knots for extended periods of time, if necessary. A special feature of this dual function is that in the event of winch-engine failure the main engine might be used to power the deck winch for certain operations. Another advantage is that in the event of main-engine starter failure, the winch-engine drive and torque converter might be used as a source of cranking power.

A standard friction-type clutch attached to the torque converter is operated by air controls at the winch operator's position on deck. A simple arrangement of quick change crossover valves will allow either the main-engine or winch-engine drive to be operated from the wheelhouse

A similar type arrangement was made aboard the exploratory vessel John N.

Cobb in 1950 for slow-speed trolling. (See; U. S. Fish & Wildlife Service Fishery Leaflet No. 385, Part II, "John N. Cobb Uses New Rig for Slow Speed Trolling.")



GLAZING SHRIMP NOT NECESSARY IF PACKED WITH PROTECTIVE OVERWRAP

Experiments have shown that unglazed raw shrimp can be held satisfactorily for long-term storage at 0 $^{\circ}$ F. (-17.8 $^{\circ}$ C.) when packaged in waxed cartons with suitable overwrap. Tests by a tasting panel are reported to have indicated that the glazed and unglazed shrimp could not be distinguished from each other. A glazing operation does not seem to be necessary if the package has a protective overwrap.

--Gulf and Caribbean Fisheries Institute, Abstracts, 1953



STORAGE TESTS ON FROZEN FRIED FISH STICKS PREPARED FROM PACIFIC COD

INTRODUCTION

West coast producers of fish sticks have needed reliable information on the quality changes and on the maximum storage life of frozen fried fish sticks made from Pacific cod (<u>Gadus macrocephalus</u>). The purpose of the work reported here was therefore (1) to study the quality changes in fried fish sticks prepared from

Pacific cod during a 1-year storage period at 0° F, and (2) to determine the maximum period that the fish sticks can be stored at 0° F, in good marketable condition

PROCEDURE

PREPARATION OF FISH BLOCKS: Pacific cod of good quality from Hecate Strait, held in the round 4 to 5 days in ice, were used. The fish were obtained from the top of the load on the fishing vessel, and only firm fish with good skin color and with no softening or bruises were selected. The fish were filleted, skinned, trimmed, deboned, and packed into 9-pound heavily-waxed cartons $(3\frac{3}{4}$ inches x $9\frac{1}{4}$ inches x $11\frac{1}{4}$ inches) and blast-frozen at -25° F. The resulting fish blocks were stored at 0° F. for 6 days prior to being processed into fish sticks.

PREPARATION OF FISH STICKS: The fish sticks were prepared commercially from the fish blocks at a local plant. The blocks were cut into fish sticks with a band saw; the fish sticks were covered with batter and breaded with standard commercial ingredients.



Examining fish sticks after storage at 00 F.

ed with standard commercial ingredients, and deep-fat fried at 380° F. for 55 seconds in hydrogenated oil^{2/} that had been used in fish-stick processing for about 20 hours. The fried fish sticks were blastair cooled, then packaged in 10-ounce waxed cartons, 10 to a carton, with a wax-paper overwrap. These cartons were frozen in a plate freezer for 2 hours and were then left at -20° F. overnight. Lastly, the cartoned frozen fish sticks were cased and stored at 0° F. in the Laboratory cold storage.

1/ The rating "good marketable condition" is defined as being equivalent to not less than grade B (a minimum score of 70 points) in the proposed United States Standards for Grades of Frozen Fried Fish Sticks,

2/ The ratio of tank capacity to hydrogenated-oil consumption per day was about $2\frac{1}{2}$ to 1.

ORGANOLEPTIC EXAMINATION PROCEDURE: The samples were organoleptically judged at approximately monthly intervals. Quality evaluations were made on the frozen fish sticks before and after heating in accordance with the proposed United States Standards for Grades of Frozen Fried Fish Sticks. 3/ The frozenfish

Table 1 - Scale of Organoleptic Ratings							
Description of Flav	or and/or Odor of Fish Sticks	Organoleptic					
Whole Fish Stick	Component Parts 1/	Rating					
Normal, characteristic of fresh product; no off-flavor or off-odor.	Normal, characteristic of fresh product; none to trace off-flavor or off-odor; barely noticeable.	Good (Grade A)					
Lacking normal flavor or odor of fresh product; none to slight off-flavor or off- odor; barely noticeable.	Lacking normal flavor or odor; slight to moderate off-flavor or off-odor; definitely noticeable but not objec- tionable.	Reasonably Good (Grade B)					
Slight to moderate off- flavor or off-odor; defi- nitely noticeable but not objectionable.	Moderate off-flavor or off-odor; defi- nitely noticeable; objectionable in localized areas only.	Fair (Substandard)					
Strong or objectionable off- flavor or off-odor; dis- tasteful but not repugnant.	Strong or objectionable off-flavor or off-odor; diffusing throughout adjacent tissue.	Poor (Out of Grade)					
	// Breading, dark meat (including the layer of skin fat), and light meat. (Each of these parts is judged separately and the rating is on the basis of the worst condition observed.)						

sticks were heated by spacing them $\frac{1}{4}$ -inch apart on a metal tray and then placing the tray in a properly-ventilated oven preheated to 400° F. At the end of 16 minutes, the tray of fish sticks was removed and the fish sticks were examined by a panel of 4 to 7 people experienced in the organoleptic testing of fish.

Under the proposed United States Standards for Grades of Frozen Fried Fish Sticks, a grade A product must have good flavor and odor and score not less than 85 points on other factors. A grade B product must have reasonably good flavor and odor and score not less than 70 points on other factors. A substandard product is one that fails to meet the requirement for grade B. Under these fish-stick standards, the quality rating (grade) is determined, in part, by physical factors not especially subject to change during cold storage, such as uniformity of size and shape, color, continuity of the coating, degree of oiliness or crumbliness, and presence of defects (broken and damaged sticks, bones, and blemishes). The quality rating is also determined, in part, by organoleptic factors of texture, flavor, and odor-which are subject to change. The organoleptic rating of the present samples of fish sticks was based on the flavor and odor of the whole fish stick (breading plus fish, as a unit) and on the separate evaluation of the breading, the light meat, and the dark meat (including the layer of skin fat).

In order that these generalized fish-stick standards could be implemented, detailed examination procedures and the scale of organoleptic ratings shown in table 1 were developed. In the development of this scale, consideration was given to the fact that an off-odor or flavor--for example, rancidity--tend to localize in critical areas, such as in the layer of skin fat. Evaluation of these critical areas is important, since if only the whole stick is tested, an off-flavor in a critical area may not be noticed and the test will be less sensitive. Flavor and odor were therefore judged separately on the whole stick and on the breading, dark meat (including layer of skin fat), and light meat.

The termination of the maximum period of storage for fish sticks in good marketable condition was taken to be that time at which rancidity and any off-odors and/or 3/ These standards were published in the Federal Register on April 26, 1956, by the Agricultural Marketing Service, U. S. Department of Agriculture, Washington 25, D. C.

flavors were definitely noticeable (moderate in intensity) in any component part of the fish stick but were not objectionable.

RESULTS AND DISCUSSION

The data on the organoleptic observations are given in table 2. As indicated in the table, the maximum period that these fish sticks could be stored at ${}^{\circ}$ F. in good marketable condition was 8 months.

Despite the initial appearance of trace rancidity in the skin-fat layer at the end of 3 months of storage, and the advance of rancidity to slight at the end of 5 months of storage, no noticeable increase in rancidity was observed during the next 2 months. However, after 8 months of storage, rancidity was definitely noticeable (moderate in

Table 2 - Organoleptic Ratings of Pacific Cod Fish Sticks 1/Stored at 0° F.						
Storage Time	Observations	Rating	Grade			
Months 0	Good, sound product.					
1	No decrease in quality.					
2	Slight toughening in texture of meat.	Good	A			
. 3	A trace of rancidity detectable in skin-fat layer but definitely not detectable in white-meat portion,					
5	Slight rancidity detectable in skin-fat lay- er but not detectable in white-meat por- tion. Some tasters detected trace of off-flavor in breading.					
6	No further noticeable change in rancidity.					
7	No further noticeable change in rancidity.					
8	'Slight off-flavor due to rancidity detectable in whole stick. Rancidity definitely noticeable (moderate in intensity) in skin-fat layer and in dark meat, and detectable in adjacent light meat but not otherwise detectable in light meat. Light meat, when slightly warm, moderately tough and characterized by slight dryness and slight woodiness of texture but, when hot, not noticeably tough, dry, or woody.		В			
9	Slight further decrease in quality.					
11½	Slight further decrease in quality. Ran- cidity advanced but other off-odors or flavors not apparent. Fish sticks con- sidered barely marketable, owing to rancidity.	Fair	Substandard			
	from good-quality cod by deep-fat frying at 380° F, for 55 second k processing for about 20 hours.	s in hydrogenated oil th	nat had been used in			

intensity) in the skin-fat layer and it was detectable in the adjacent light meat but was not otherwise detectable in the light meat. At this stage, the fish sticks were considered to be reasonably good in flavor and odor and in Grade B. After 9 months and after $11\frac{1}{2}$ months of storage, they were considered to be fair in flavor and odor and in the substandard grade.

Although the hydrogenated cooking oil employed in this experiment had been used in fish-stick processing for about 20 hours, the age of the oil was apparently not a factor in the storage life. Rather, the limiting factor was considered to be the oxidative changes in the dark-meat skin-fat layer. The use of poorer-quality fish, older fish blocks, or higher storage temperatures and otherwise poorer storage conditions would undoubtedly have reduced the storage life of the fish sticks.

CONCLUSIONS

- (1) The quality changes most critically affecting the storage life of frozen fried fish sticks made from good-quality Pacific cod(<u>Gadus macrocephalus</u>) prepared under commercial conditions (deep-fat fried at 380° F. for 55 seconds in hydrogenated oil that had been used in fish-stick processing for about 20 hours) and stored at 0° F, were the oxidative changes in the layer of skin fat in the dark meat.
- (2) The maximum period that fried fish sticks, produced from good-quality Pacific cod under the conditions of this experiment, can be stored at 0°F. in good marketable condition 4′ was organoleptically determined to be 8 months.

 4/For explanation of footnote see footnote 1′ on page 15.

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EFFECT OF RAW MATERIAL ON TUNA-MEAL QUALITY

BACKGROUND

Fish meals show considerable variation in their nutritive value--even when manufactured from the same species of fish and by the same process. An important phase in the determination of the causes of this variation is a study of the protein quality of the meals. Work on such protein-evaluation studies was started several years ago by Dr. C. R. Grau in the Poultry Husbandry Department of the University of California. At that time Dr. Grau found considerable variation in the nutritive value of fish meals, but he was not able to continue the studies long enough to determine the causes for this variation.

In studies that have been undertaken by the U. S. Fish and Wildlife Service on the quality of fish meal, a large number of samples have been collected from reduction plants located in the important fishing centers of the United States. These samples are being tested at several laboratories for different variables. In collaborative studies at the Poultry Husbandry Department of the University of California, chicks have been used to test the meals for protein quality. In addition, a systematic search has been undertaken to determine the causes for the differences in the protein quality of tuna meals. This phase report will describe the work that has been done to the present on the effect of raw material on the nutritive value of the meal.

SAMPLE COLLECTION AND PREPARATION

The samples used for these studies were collected at San Pedro, Calif., in May 1955. The following portions from skipjack tuna (Katsuwonus pelamis) were collected: raw skin, raw caecae, raw livers, raw loins, cooked loins, and cooked heads. Hearts from skipjack were not available, but hearts from yellowfin (Neothunnus macropterus) were obtained and used instead. The tuna from which the samples were taken were of marginal quality.

Each of the selected portions was ground and blended in an electric food chopper and then was packed in six 1-gallon press-top cans (but only one-half of a can in the case of the skin). The one-half can of skin and two cans of each of the other portions were placed in frozen storage. The four cans remaining of each of the portions were allowed to stand at the open-air temperature for 2 days (48 hours), at the end of which time two cans of each of the raw portions were placed in the freezer. The next day (72 hours), two cans of both cooked and raw portions were put into the freezer. After 7 days (168 hours), the remaining two cans each of the cooked loins and the cooked heads were put in the freezer. During the period that the material was allowed to stand in the open, the temperature ranged from 56° to 66° F. The cans, when placed in the freezer, were fresh-frozen at -20° and then held at 0° F. After all the samples had been assembled and frozen, they were sent to the Poultry Husbandry Laboratory of the University of California, where they were lyophilized (freeze-dried) prior to being incorporated into test diets. The treatments given the various samples are summarized in table 1.

Table 1 - Treatment of Samples										
Sample	Frozen Immediately Held at 56°-66° F. Held at 56°-6									
7										
Raw skin	2	-	-	-						
Raw caecae	2	2	2	-						
Raw livers	2	2	2	-						
Raw hearts	2	2	2	-						
Raw loins	2	2	2	-						
Cooked loins	2	-	2	2						
Cooked heads	2	-	2	2						
1/ Frozen at -200 F.,	1/ Frozen at -200 F., stored at 00 F., and then lyophilized for incorporation into test diets.									

EXPERIMENTAL PROCEDURE

The bioassay utilized 10-day-old male chicks for the protein-evaluation studies. Enough fish protein to provide 20 percent crude protein in the final diet was added to a basic mixture of essential dietary components. The basal mixture and the procedure used for the chick-feeding tests were those described by Grau and Williams (1955). Modifications were made, however, on housing and on replication procedure. Special cages adapted from rat cages made it possible to conduct nine treatments simultaneously, with high accuracy. Each fish meal was fed to four groups (one treatment) with four chicks per group. These modifications were made to obtain the greatest amount of information from the smallest sample size. The protein was evaluated by the rate of growth of the 16 chicks during an 8-day test period.

RESULTS OF FEEDING TESTS

In the tests using the unspoiled material, the raw skin and the cooked heads produced poor growth, but all of the other materials produced good growth.

For the tests using the spoiled material, the same growth was obtained as with the unspoiled material, except with the cooked loins. Whereas the spoiled raw loins produced good growth, the spoiled cooked loins produced an actual weight loss in the chicks. The growth rate of the chicks was not improved when the spoiled cooked loins were autoclaved for 15 minutes at 15 pounds pressure, indicating that the negative growth was not caused by heat-labile toxin. Similarly, the growth rate was not improved by the addition of chlortetracycline (aureomycin) at 10 micrograms per kilogram, indicating, in addition, that the negative growth was not caused by pathogenic bacteria.

DISCUSSION

The negative growth response obtained with the spoiled cooked loins indicates that the condition of the raw material may be an important factor in the nutritional value of the tuna meal. The results offer a number of possibilities for future studies. Since the indications are that the negative growth was caused neither by heatlabile toxin nor by pathogenic bacteria, the probable cause was damage to the protein. These feeding tests were repeated, and the results verified. Further spoilage studies are being conducted under more rigidly-controlled conditions with several species.

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LITERATURE CITED

Grau, C. R., and Williams, M. A.
1955, Fish Meals as Amino Acid Source in Chick Rations. Poultry Science, vol. 34, no. 4, July, pp. 810-817.



RESEARCH PROGRAMS DISCUSSED AT PACIFIC FISHERIES TECHNOLOGISTS CONFERENCE

At the Seventh Annual Conference of the Pacific Fisheries Technologists, held at Gearhart, Ore., March 18-21, the current status of some of the Fish and Wildlife Service's contract research with Saltonstall-Kennedy Act funds was discussed. Maurice Stansby of the Seattle Fishery Technological Laboratory presided at this



session of the meeting and outlined some of the programs under way in the new Fish and Wildlife Service research program on fish oils and fish meals. Details of several of the programs were discussed by those project leaders who were in attendance at the meeting.

Dr. Walter O. Lundberg of Hormel Institute, University of Minnesota, Austin, Minn., described the three programs under way in his laboratories on (1) composition and analysis of fish oil fatty acids, (2) separation of fish oil fatty acids by em-

ployment of inclusion-type compounds, and (3) the chemistry of compounds responsible for odor in fish oils.

Dr. W. Duane Brown described the collaborative program under way at the Food Technology Department, University of California, at Davis, on oxidative deterioration in fish and fishery products. Results of experiments were discussed on

the mechanism of oxidation of oil in fish tissue, on application of antioxidants to retarding of such oxidation, on the reaction between fish oil and protein in such fishery products as fish meal, and on alterations in pigments such as those resulting in green tuna.

Dr. J. E. Oldfield of the Animal Husbandry Department, Oregon State College, Corvallis, Ore., discussed his program on incorporation of fish oil in the diet of swine and its effect on growth and on quality of the resulting meat, Dr. C. R. Grau of the Poultry Husbandry Department, University of California, at Davis, discussed the collaborative program on nutritive value of protein in fish meals. Dr. E. Geiger of the Pharmacology Department, University of Southern California, described experiments under way on unidentified growth factor assays.

John Dassow of the Seattle Fishery Technological Laboratory discussed at another session of the conference the Service's program of development of voluntary grade standards for fishery products.



PROGRESS IN RESEARCH ON SOUTHERN OYSTERS

The three university groups conducting research related to technological improvements for the Southern oyster industry are well started on their second year.

They reported recently that satisfactory progress is being made in every phase of the work. One report of the work conducted at Tulane University is already published under the title, "Osmotic Behavior and Bleeding in the Oysters (Cyassostrea virginica)." by M. Fingerman and L. D. Fairbanks, in Tulane Studies in Zoology, vol. 3, no. 9, April 12, 1956. Three reports are now in editorial hands; and three or four additional reports on the work done in the first year are expected to be received within 45 to 60 days.

The work during the second year has been expanded at Louisiana State University, with four lots of oysters being prepared for frozen storage tests in contrast with one in the first season. Florida State University reports unexpectedly encouraging results in the latest experiments on sterilization of oysters by irradiation with Cobalt 60. The thiobarbituric acid tests have also been developed to give a quite satisfactory method of following oxidative rancidity affecting quality of stored oysters. They expect to develop many more cooked oyster products and dishes for frozen storage



Placing oysters in equipment for sterilization by gamma radiation.

studies this season. At Tulane University recent work has related to study of liquor losses of imported "Northern" oysters under identical conditions used in their work with the local product. Major emphasis of work during the coming year will be on more intensive study of the internal mechanism of the live oyster which is responsible for regulating the amount and composition of body fluid losses.

Note: See also Commercial Fisheries Review, April 1956, p. 9.

NEW TECHNIQUES FOR FREEZING AND STORING NORTH ATLANTIC LOBSTERS

In order to make possible the utilization of the large quantities of deep-sea lobsters discovered by the Service's exploratory fishing vessel <u>Delaware</u> in the Georges Bank fishing area off the coast of Massachusetts, experiments have been conducted by the Fish and Wildlife Service Technological Laboratory at East Boston, Mass., to determine (1) the feasibility of freezing lobsters aboard a fishing vessel, and (2) means of increasing the storage life of frozen lobster meat. The following report concerns the results so far obtained regarding these experiments:

FEASIBILITY OF FREEZING LOBSTERS ABOARD A FISHING VESSEL: A so-dium-chloride brine (22 percent salt by weight), used successfully for freezing New England groundfish aboard the <u>Delaware</u>, was tried as a freezing medium for whole or butchered cooked!/ lobsters. Lobsters landed on the vessel were immediately



Large, deep-water, lefthanded lobster captured on the southeastern edge of Georges Banks, The utilization of this newlydiscovered resource has been delayed pending development of methods of preservation on board the vessel.

cooked in a barrel containing sea water heated by steam from the vessel's boiler. After cooking, these lobsters either whole or butchered (by removing the tails and claws) were put into polyethylene bags, frozen to 0°F. in the vessel's brine-immersion freezer, and stored at 0°F. in the refrigerated hold. Examination of these lobsters when landed showed that 50 percent of the bags used had been torn or punctured by the sharp spines on the claws of the lobsters. This caused intimate contact between the lobsters and brine during freezing, resulting in excessive salt penetration into the meat. As a result of this salt penetration, lobsters contained in polyethylene bags that were punctured were inedible when examined one week after being frozen. Lobsters in polyethylene bags that were not punctured lost their characteristically pleasing flavor and were tough and dry three weeks after being frozen and stored at 0°F. Such a method of freezing therefore was not suitable.

been delayed pending development of methods of preservation on board the vessel.

In view of these findings, it was thought that the use of a freezing solution which provides a protective glaze on the frogen preservation on board the vessel.

In view of these findings, it was thought that the use of a freezing solution which does not cause excessive salt penetration into the lobster meat might be successful. A glucose (34 per-

cent)-salt (12 percent) solution used in small-scale tests in the laboratory's project on freezing fish at sea seemed to have the desired properties. To determine the possibility of freezing cooked whole lobsters in a glucose-salt solution aboard the fishing vessel, landing the lobsters in a frozen condition, thawing ashore, vacuum packing the meat in cans, refreezing, and storing the frozen meat, the following pilot-plant experiment was performed:

Cooked whole lobsters were precooled to a temperature of 45° F. in running fresh water prior to freezing. Some of these lobsters were then butchered and others were left whole. Both lots were cooled to 0° F, by immersion in the glucosesalt freezing solution. Once frozen, some were left without packaging and some were packed in polyethylene bags. These lots were then stored for two weeks (to simulate the length of time they might be kept at sea aboard the fishing vessel) at 0° F, and -20° F. They were then thawed, the meat picked out and packed in C-enamel lined cans under a vacuum of 27 inches of mercury, frozen, and stored at 0° F.

^{1/} Earlier tests on frozen lobsters showed that when whole frozen uncooked lobsters were cooked, the meat stuck very tightly to the shell and was extremely difficult to remove. Therefore, in this experiment the lobsters were cooked prior to freezing.

After 8 weeks from time of freezing the whole lobsters, no deterioration in the quality of the meat had occurred. The lobsters butchered before freezing in the glucose-salt solution were slightly, but not objectionably salty, due to small amounts of salt penetration into the meat. However, no salt penetration was noted in the lobsters frozen whole.

The glucose-salt freezing solution used seemed to provide a protective glaze which contributes greatly to the storage life of frozen whole lobsters. These results indicate that freezing of deep-sea lobsters aboard a fishing vessel is a definite possibility. Tests on a larger scale will be conducted.

STORAGE LIFE OF FROZEN LOBSTER MEAT: A number of deep-sea lobsters brought in alive by the $\overline{\text{Delaware}}$ were cooked, and the meat vacuum-packed in C-enamel cans under a vacuum of 27 inches of mercury, frozen, and stored at temperatures of 0° and -20° F. The following results were obtained in these tests:

Cooked lobster meat thus packed in cans, frozen, and stored at 0° F. showed loss of texture and flavor in 6 to 8 weeks. Storage at -20° F. increased this storage life to 10-12 weeks. By adding a 2.5 percent salt solution to the canned meat and storing it at 0° F. a storage life of 12 to 14 weeks was obtained. Tests are presently being conducted on the storage life of cooked lobster meat packed with a 2.5-percent salt solution under a vacuum of 27 inches of mercury and stored at -20° F., and on the effect of different levels of vacuum on the storage life of frozen lobster meat.

--JOHN A. PETERS, FISHERY PRODUCTS TECHNOLOGIST,
--JOSEPH W. FLAVIN, REFRIGERATION ENGINEER,
FISHERY TECHNOLOGICAL LABORATORY,
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SHARKS ARE EDIBLE

Sand sharks, and almost all other kinds of small sharks, are edible. Very large sharks and hammerhead sharks should not be eaten. A prejudice exists against the consumption of shark meat, but this is largely unfounded. Perhaps it is partly due to the fact that shark meat spoils more quickly than that of other fish. This is particularly true of the dark portion. Actually shark is eaten in many parts of the world, although sometimes it is given names which conceal its identity.

To prepare shark meat for food, cut fillets of the light meat about 9 by $\frac{1}{2}$ inches thick and wash them thoroughly in salt water. Place the fillets inice or in a refrigerator for about 24 hours, or soak them in a clean cold brine for about 6 hours. If they are kept on ice or in the refrigerator, a brine soak of about 2 hours will be sufficient. The fillets should be used immediately or else frozen. They can be boiled or fried.

--"Sea Secrets," The Marine Laboratory, University of Miami, Coral Gables, Fla.



Additions to U.S. Fleet of Fishing Vessels

A total of 47 vessels of 5 net tons and over received first documents as fishing craft during April 1956, according to the U. S. Bureau of Customs. This was 11 vessels more than the number reported for the same month of 1955.

The Gulf area led all others during April 1956 with 14 newly-documented craft. followed by the Pacific area with 10; the Chesapeake and Alaskan areas with 9 each; the South Atlantic with 3; and the New England and Middle Atlantic areas with 1 each,

Table 1 - U. S. Vessels Obtaining First Documents As Table 2 - U. S. Vessels Obtain-								
Fishing Craft, by Areas, April 1956 and Comparisons ing First Documents as								
Area	Ap	April		Jan April Total				
Area	1956	1955	1956	1955	1955	April 1956		
		(Number	·)		Net Tons Number		
New England	1	1	6	7	18	5 to 9 26		
Middle Atlantic .	1	2	8	5	13	10 to 19 7		
Chesapeake	9	2	21	11	54	20 to 29 5		
South Atlantic	3	6	14	15	65	30 to 39 6		
Gulf	14	10	29	29	103	40 to 49 1		
Pacific	10	9	14	26	117	50 to 59 1		
Great Lakes	-	-	2	2	9	109 to 120 1		
Alaska	9	4	12	12	35	Total 47		
Hawaii	-	2	1	2	3			
Virgin Islands	-	-	-		1	The State of Texas was		
Total	47	36	107	109	418	credited with 50 percent of		
	the newly-documented craft							

5	to	9			26
10	to	19			7
20	to	29			5
30	to	39			6
40	to	49			1
50	to	59			1
109	to	120			1
	T	otal			47

The State of Texas was credited with 50 percent of Note: Vessels are assigned to various sections on the basis of their home port, the newly-documented craft reported for the Gulf areadur-

ing April. During the month there were 2 vessels each documented for the first time as fishing craft with registered home ports on the west coast of Florida and in Mississippi and Louisiana. Alabama had 1 newly-documented vessel during the month. Among the Pacific Coast States, Washington led all others with 6 of the 10 vessels credited to the area. The State of California had 3 and Oregon had 1.

During the first four months of 1956, a total of 107 fishing vessels was documented for the first time -- only 2 less than the number reported for the corresponding period of last year. During the first four months of 1956, the Gulf area led all others with 29 newly-documented vessels--the same number reported for the corresponding period of last year.



BAIT HERRING PREPARED BY NEW METHOD: Over 3.3 million pounds of herring were frozen this season in the Ketchikan, Alaska, area for use as bait. Of this amount a considerable portion is diverted to the sport fishing trade. At the time herring were being prepared, a different method of preparing bait for sports

fishing was observed. Instead of allowing the fish to die in the usual manner, the herring were brailed alive and placed in a small tank where they were killed by means of an electrical current. The herring were then frozen individually and packaged in convenient size fiber containers. The advantages claimed for this method of preparation are that the herring do not lose their body scales and are therefore brighter and more natural appearing than are herring prepared by other methods. As the herring are frozen individually, it is not necessary for the fishermen to break up a block of fish each time he desires new bait.



Biological Studies Aid Sport Fishermen

Studies designed to put more fish in the sport fishermen's creel are being conducted in eight laboratories operated by the U. S. Fish and Wildlife Service, the Service's Director announced on May 15. Results of these studies are made available to state conservation officials and others interested in the propagation of fish.

Nutritional studies for trout and salmon are being made at Cortland, N.Y., and at Willard, Wash., respectively. At Leetown, W. Va., and at Seattle, Wash.,

studies are being made on the various diseases of trout and salmon, particularly those diseases which strike at fish in the hatcheries. Studies at Entiat, Wash., relate to various phases of fish culture, and best types of apparatus, pond construction, and other matters pertaining to the physical, biological, and chemical end of fish rearing.

At three other laboratories—Convict Creek, Calif., Logan, Utah, and in the Great Smoky-Shenandoah National Park area—the studies pertain to stream and other water conditions and their effect on trout, especially hatchery-raised trout. In addition, there is the project designed to rid the Great Lakes of the sea lamprey.



Trout hatchery, Hagerman, Idaho

The propagation of warm-water fish also has its problems, although they are quite different from the problems that affect the rearing of trout and salmon. This is mainly because warm-water species are usually placed in earthen ponds to propagate naturally, while trout and salmon are spawned artificially, and warm-water fish are reared in water temperatures that are much higher than the maximum required for trout and salmon. In recent years, more attention is being given to the growth and survival problems of the various types of warm-water fish.

Nutritional studies are important because the food item is a considerable part of the cost of propagating fish and because improper feeding can cause heavy losses in hatchery fish and retard the development the fish need to combat the rigors of life in natural waters.

In the development of practical diets, vitamin needs, the effect of diets upon body tissue, the effect of metabolic products on the carrying capacity of ponds are among the things studied. Results include getting much more poundage per unit of cost and time and more success in transferring fish from the hatchery to the distant streams.

Numerous studies are being made on fish diseases due, probably, to virus and bacteria. Determining the cause and cure of various infections which have occurred in rainbow trout hatcheries is one objective.

At the salmon cultural station, work is being done on the development of hatchery techniques, improvement of incubation equipment, effects of temperature changes, feeding trials, methods of maturing salmon, electrical diversion of fish into fishways and away from power and irrigation outlets, proper construction of ponds to assure maximum fish production, and numerous other problems.

The field investigations being done in California, Utah, and in the Great Smoky-Shenandoah area cover two general fields. One is a series of studies of the adaptations which a hatchery fish must make to fit into natural stream and high mountain lake environment. The other concerns various things which affect naturally-produced trout in their native waters.



California

LOGGING AND FISHERIES COOPERATE IN ELIMINATION OF SALMON STREAM DAMAGE: Timber operators, owners, and loggers have been called upon by the Department of Fish and Game to cooperate in the elimination of stream damage which is harming silver salmon and steelhead fisheries in California's north coast area, that Department's May 1956 Outdoor California periodical reports.

A series of three bulletins titled "Fish News for Timber Operators and Fishermen" are being mailed to approximately 2,000 operators, owners, and loggers to familiarize all segments of the logging industry with problems such operations pose on salmon and steelhead streams.

In a letter to leaders of the industry, the Department Director said: "We are hopeful that if various segments of the logging industry become familiar with these problems they will cooperate with us in attempting to eliminate the problems for the future welfare of these valuable wildlife resources."

The bulletins point out that siltation and blocking of streams resulting from logging operations are the principal factors harmful to fish. At the same time it is pointed out that there is no reason why salmon, steelhead, and logging can't get along together without too much difficulty.

In pointing up the problems as seen by the department, the bulletins describe the various factors which affect the fish, particularly in relation to their spawning habits and needs.

Excerpts from the bulletins follow:

"The value of lumber and the lumber industry to the north coast area, of course, is great. The annual value of the salmon and steelhead is less than that of lumber. But the value of each is important to the welfare of California's economy and her people. It need not be a choice between the two, for both can exist without serious conflict. Some loggers today are getting their logs out economically and at the same time are protecting

the streams for salmon and steelhead. Many others could also help with minor changes in their planning and operations."

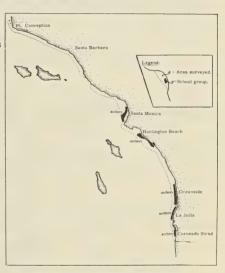
The bulletins further point out that the department has legal responsibility for the welfare of the fish, but seeks to obtain cooperative efforts from loggers in preventing damage to the streams, rather than to prosecute violations after the damage has been done.

* * * * *

PELAGIC FISH DISTRIBUTION AND BEHAVIOR STUDY CONTINUED (Airplane Spotting Flight 56-3): The inshore area from San Francisco to San Diego was studied from the air by the California Department of Fish and Game Cessna 170" (1359D) April 2-6, 1956. This was the third of a series of periodic flights designed to study pelagic fish distribution, abundance, and behavior in 1956.

No schools of fish were sighted in the Central California area (San Francisco to Pt. Conception) during this flight. It is known, however, that schools of anchovies were present in Monterey Bay and it is believed that heavy seas stirred up by strong northwest winds drove the fish to depths below the limit of visibility from the air. Another factor contributing to poor visibility into the water was the presence of very rich "brown" (dyanoflagellate) water along the Central California coastline.

Of particular interest was the presence of hundreds of "swarms" of euphausiids in the Monterey Bay region. These swarms ranged from 5 to 40 feet in diameter and appeared at the surface where they were preyed upon by thousands of gulls. The sport salmon boats were working in the areas of the bay where these swarms were found, indicating that the salmon were also concentrated in these areas, possibly to feed upon the euphausiids.



Airplane Spotting Flight 56-3, April 2-6, 1956,

"Green" (diatom) and "blue" (oceanic) waters occupied the inshore area of southern California with occasional reddish-brown (dyanoflagellate) "blooms" present in the Newport and Pt. Vicente areas.

Species identification of fish schools was possible through a combination of observation from the air and interviews of commercial fishermen working in areas

Region	No. Schools	Total Area (Sq. Ft.) in Region
Coronado Strand.	62	33,000
La Jolla	32	108,000
Oceanside	118	248,000
Huntington Beach	48	62,000
Santa Monica	65	187,000
Total	325	638,000

cial fishermen working in areas where fish were spotted. Night fishermen could find no anchovies in the Huntington Beach area but in the daytime commercial airplane spotters found large schools. Conversely, night fishermen found jack mackerel schools in this same area at night but fishermen and planes working at day-

time found but a few small schools of jack mackerel. All schools seen on this flight were tentatively identified as anchovies.

No schools were seen which contained sardines, and likewise no sardines were taken by commercial fishermen during this period.

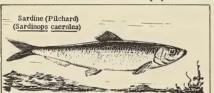
Anchovy: A count of the number of schools and an approximation of the area of each school was made. The results are found in the table.

There was a decided increase in the numbers of anchovies in the San Diego and Santa Monica areas since the March flight. The schools off Huntington Beach and Oceanside remained in about the same number and size.

* * * * *

PRESEASON 1955/56 PACIFIC SARDINE PREDICTION CONFIRMED: When the California 1955/56 Pacific sardine season ended February 1, the catch had reached approximately 75,000 short tons, or only about 7,000 tons more than the previous season.

In July 1955 the Marine Research Committee reported that prior to the start of the season the entire adult population of the Pacific sardine was in the neighbor-



hood of 600,000 tons, that approximately 300,000 tons of adult fish were in California waters, and that 150,000 tons might be taken if economic conditions did not curtail the fleet's efforts.

This, the Committee report stated, was about the same amount of fish as was available to the fishery in the 1954/55, season which was hampered by labor dis-

putes at the beginning of the season and unfavorable market conditions which kept the vessels on limits. This resulted in holding the catch to 67,000 tons.

The 1955/56 season also had a delayed start because of labor disputes which at first kept the catch below that of the previous season. However, since the vessels were not greatly hampered by limits, they exceeded last season's landings by mid-season, and finished with a slightly higher total catch.

Season Highlights: Several interesting aspects of the season are apparent:

- 1. Although the canneries were accepting fish and the infrequent imposition of limits had little effect on the size of the individual boat catches, the fishermen's success declined markedly as the season progressed.
- 2. About 50 percent of the commercial catch by number was of fish born in 1952.
- 3. Evidence to date indicates that the spawn success since 1952 has been poorer than in 1952, which was considered weak.
- 4. According to the Marine Research Committee preseason report, the adult sardine population was smaller preceding the 1955/56 season than it was before the 1954/55 season, but that a higher percentage (about 50 percent) was off California in 1955/56.
- 5. The evidence at hand indicates that the sardines off Southern California the past two years were chiefly fish which had been born off Lower California.

Outlook for Future: From the foregoing it would seem that the sardine population is still at a low level and that unless favorable conditions allowed for a good spawn survival the outlook for the industry is not good.

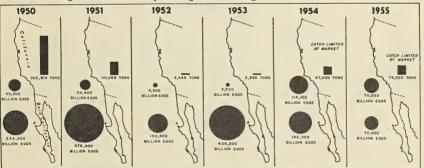
Of course, a higher percentage of sardines could possibly move in from Mexico and yield an increased catch, but without the favorable recruitment of young fish this would only result in a further decline in the total population.

There are a number of hypotheses regarding reasons for the poor recruitment of recent years. Two are discussed in the recent Marine Research Committee publication "Progress Report, California Cooperative Oceanic Fisheries Investigations, 1 July 1953--31 March 1955." The two hypotheses discussed are: (1) total survival of sardines from spawning is not dependent upon brood stock size except at stock levels lower than any yet experienced in the sardine population; and (2) above and below certain population levels the survival of sardines from spawning depends on the size of the brood stock, and these critical levels have occurred in the history of the sardine fishery. The effect of the brood stock size on recruitment definitely needs further study.

This paper is a departure from former Marine Research Committee reports since this is the first time that a technical discussion of fishery dynamics has been included.

* * * * *

SARDINE CATCH FOR 1956/57 MAY BE LOWER: Catches of California's once great sardine fishery may be lower next season, as the total sardine population continues to decline, the State's Marine Research Committee was told recently by fisheries investigators of five cooperating research agencies.



Comparison of Pacific sardine spawning and California catch, 1950 through 1955 (Source - U. S. Fish and Wildlife Service).

The Committee, which coordinates and helps finance a Statewide research program, met in San Francisco to hear the scientists' report and pass on division of its \$100,000 budget among the five agencies.

The sardine catch for the season just ended totaled 74,000 short tons, up about 7,000 tons from the previous season. Economic factors held the catch somewhat below what the resource could have provided, the researchers pointed out, according to a March 30 release from the California Department of Fish and Game.

Agencies cooperating in the program include the California Academy of Sciences, California State Department of Fish and Game, Stanford University's Hopkins Ma-

rine Station, University of California's Scripps Institute of Oceanography, and the U. S. Fish and Wildlife Service.

* * * * *

WHALING INDUSTRY REACTIVATED: The catching and rendering of whales, formerly conducted at Fields Landing, Calif., has been reactivated by the establishment of the two land stations at Point San Pablo, Richmond (near San Francisco), and the licensing of two catcher boats. The whale catchers are the M/V Dennis Gayle and the M/V Donna Mae. The Dennis Gayle formerly operated out of the Fields Landing station.

The catcher boats and the land stations expect to catch and process from one to four whales a day during the whaling season. The first catch, made on May 9, was a 36-ton humpback whale. In addition to utilizing the whales for meal and oil, it is believed that suitable parts of the whale meat will be chopped and frozen for mink or other animal food. This venture is the first attempt to catch and process whales in the United States since 1953.

As whales are plentiful in the offshore waters of California during the summer months, it is possible that another shore plant will be established at Morro Bay in Southern California.

For catchers attached to land stations, the open season for baleen (blue, fin, humpback, sei, or minke) whales is May 1-October 31 and for sperm whales April 1-November 30.



Cans--Shipments for Fishery Products, January-March 1956



Total shipments of metal cans January-March 1956 amounted to 16,560 short tons of steel (based on the amount-of steel consumed in the manufacture of cans) as compared with 15,237 tons in January-March 1955. The pack of canned tuna was heavy over the three-month period.

Note: Statistics cover all commercial and captive plants known to be producing metal cans. Reported in base boxes of steel consumed in the manufacture of cans, the data for fishery products are converted to tons of steel by using the factor: 23,0 base boxes of steel equal one short ton of steel,



Delaware

OYSTER INDUSTRY, 1954/55: The amount of marketable oysters harvested in Delaware July 1, 1954-June 30, 1955, dropped because hurricane "Hazel" inflicted considerable damage to the oyster beds, the <u>Annual Report</u> of the Delaware Commission of Shell Fisheries points out.

Also, during the summer months of 1954 there was an even greater death toll in marketable oysters, but the cause was unknown.

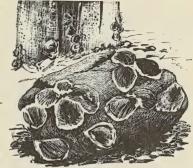
The natural seed beds of Delaware did not catch a natural growth during the year and seed in Delaware Bay was very scarce. Approximately 18,000 bushels of seed oysters were taken from the natural beds in the Delaware Bay. Only 14 oyster boats worked on the natural oyster beds in the Bay. The Commission restricted part of the natural rocks in Delaware Bay and did not allow the oyster boats to work in that area.

A total of 40,000 bushels of shells was planted on the natural rocks in Delaware Bay. Also, shells were planted in the Murderkill River, Leipsic River, and

Simons Creek. Approximately 150,000 bushels of seed oysters were tonged from the rivers in Delaware and sold to the Delaware oyster planters for the purpose of planting on leased oyster bottoms. Also, about 300,000 bushels of seed oysters were bought by the Delaware oyster planters for their leased bottoms. Most of these seed oysters came from Virginia.

About 60,000 bushels of seed oysters were planted in the Rehoboth and Indian River Bays. About 45,000 bushels of marketable oysters were taken from these two Bays.

Delaware has a large frozen sea-food plant which has expanded extensively during the year under review. During that period (July 1, 1954-June 30, 1955) the oyster products packed by all Delaware plants con-



Oyster spat (magnified many times) on small pebble.

sisted of 4 million cans of oyster stew; about 600,000 pounds of frozen canned oysters; around 100,000 pounds of breaded frying oysters; and 300,000 gallons of fresh shucked oysters. The oyster industry in Delaware has close to 3,000 employees.

The value of the oyster industry in Delaware is currently estimated at \$5 million. The oyster industry is one of the largest natural resources of the State of Delaware.



Electronic Fish Counter Developed

An electronic fish counter designed to help answer some of the questions biologists have about fish was demonstrated March 13 at the U. S. Department of the Interior building at Portland, Ore.

The device was developed by the Service's Pacific Salmon Investigations fish-counting laboratory at Seattle. Although the instrument was demonstrated on laboratory scale it has been tried out on the practical level at the Billard Locks of Lake Washington.

The basic element of the equipment is an electronic detector which gives a signal when a fish is between its electrodes. By suitable choice of electrode elements, size and sometimes species of fish may be differentiated and accurate records of passing fish made. Direction and time of passage also are shown. The electrodes are normally installed in tunnels through which the fish must pass.

The device does not use photoelectric methods, hence rocks and water-logged vegetable matter are not falsely counted, and water turbidity offers no problem. The system will work at any depth and in murky water where visual observation is impossible.

The detector utilizes the difference of conductivity between fish and water. By connecting the detectors to a third unit, a logic device, the direction of complete passages may be separately recorded while incomplete passage is ignored.

The detector may also be used as an alarm device to aid in visual counting, alerting the personnel at the counting board, thus giving them greater freedom be-

tween periods of light run. Operation is possible either from batteries or power lines. The high-frequency electric field between the electrodes is less than one-

third of a volt in amplitude, well below the threshold of sensitivity of fish.

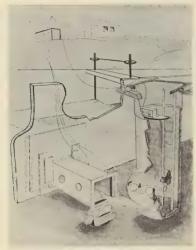


Diagram of an electronic fish counter,

The basic detector circuit was developed and is to be used as a triggering device for a split-field camera which will photograph fish allowing identification of tag numbers, species, net marks, etc. The potential of the detector as a research and management tool appeared so great, however, that primary emphasis was placed on securing its early commercial availability at a reasonable price without maintenance worries.

The detector may be used with troughs, some crested weirs, posts in stream beds, etc., where tunnels are not desirable. Tunnels are available in transparent, opaque, and pigmented materials to suit a particular installation.

The U. S. Army Corps of Engineers has purchased a multiple-bank counter for installation at its fish orientation laboratory at Bonneville. This counter has electrodes connected to a honeycomb of tunnels for counting large numbers of fish in the stream.



Exploratory Vessels Find New Shrimp and Yellowfin Tuna Areas

New fishing waters for small cocktail-size shrimp off the State of Washington and the locations of concentrations of yellowfin tuna in the southern part of the Gulf of Mexico were made recently by the exploratory fishing vessels of the U. S. Fish and Wildlife Service.

Prior to the recent development in the Gulf, yellowfin tuna was not known to be available in the Gulf of Mexico during the period from January to May, the time of their disappearance from the northern waters of that area. The discovery may lead to a year-round tuna fishery. The find was made by the exploratory fishing vessel Oregon in the offshore waters of the Gulf of Campeche.

The exploratory work on the shrimp was done by the Service's exploratory fishing vessel John N. Cobb. Previously small shrimp had been found in commercial quantities in the waters off Oregon and California. Work done during the fall of 1955 indicated that there were extensive shrimp beds from Cape Disappointment to Destruction Island, Wash., principally in waters between 50 and 100 fathoms deep. On its April exploratory cruise the John N. Cobb discovered what might become an excellent shrimp fishery off the Gray's Harbor area.

During the test, the Gray's Harbor area yielded shrimp at the rate of 2,000 pounds per hour for the best catches. Fairly consistent catches of 500 pounds an hour are reported. One day seven 30-minute drags made during the morning re-

sulted in 5,210 pounds of shrimp. Random samples showed that the shrimpranged from 110 to 122 per pound.

One commercial shrimp vessel has begun operations in the area.

Fish and Wildlife Service officials feel that the discovery of the shrimp grounds off Washington will be an important addition to the local fishing industry.

Note: Also see Commercial Fisheries Review, June 1956, pp. 25 and 31.



Federal Purchases of Fishery Products

FRESH AND FROZEN FISHERY PRODUCTS PURCHASED BY THE DEPART-MENT OF DEFENSE, APRIL 1956: A total of 1.8 million pounds (valued at \$0.8 million) of fresh and frozen fishery products were purchased during April 1956 by the Army Quartermaster Corps for the use of the Army, Navy, Marine Corps, and

Air Force. This was 16.6 percent less in quantity and 24.8 percent less in value than purchases in March 1956. Compared with April 1955, the purchases this April dropped about 18.2 percent in quantity and 12.8 percent in value.

	ases of								
Department of Defense (April and the First									
Four Months, 1956 and 1955)									
QUANTITY				VALUE					
			JanApril						
		1956							
				(\$1,000)					
1,835	2, 242	6,778	8,686	832	953	3,533	3,718		

Prices paid for these products by the Department of Defense in April 1956 averaged about 45.3 cents a pound as compared with 50.3 cents in March 1956 and 42.5 cents a pound in April 1955.

During the first four months of 1956 purchases totaled 6.8 million pounds (value \$3.5 million)--lower by 22.0 percent in quantity and 5.0 percent in value than for the first four months in 1955.

In addition to purchases of fresh and frozen fishery products indicated above, the Armed Forces generally make some local purchases which are not included in the above figures.

CANNED FISHERY PRODUCTS PURCHASED THROUGH MARKET CENTERS, JANUARY-MARCH 1956: Canned tuna, salmon, and some sardines were the principal canned fishery products purchased for the use of the U. S. Army, Navy, Marine Corps, and Air Force by the Army Quartermaster Corps through its Market Centers during the first quarter of 1956. Purchases amounted to 1,396,000 pounds of canned tuna, 601,000 pounds of canned salmon, and 8,000 pounds of sardines.

It is believed that only a portion of the requirements for canned sardines are represented in the data given since some canned sardines and canned fishery products other than tuna and salmon are procured locally and no information is available on these local purchases. Therefore, actual purchases of canned fishery products are higher than indicated in the data given.

* * * * *

QUARTERMASTER CORPS RESEARCH EMPHASIZES NEW LIGHTWEIGHT FOODS: In order to adapt military subsistence to the modern defense strategy of extreme dispersal, the Army Quartermaster Corps is seeking to develop dehydrated and concentrated foods and irradiated foods.

Maj. Gen. K. L. Hastings, The Quartermaster General of the Army, described the food picture of the future in a speech April 11 before the 10th anniversary meeting of the Research and Development Associates.

He said that for research and development men the big question is, "How will the strategic and tactical requirements of the future affect the military subsistence picture?" General Hastings answered this question as follows:

"A complete answer to this question lies only in the realm of prophecy. However, there are already a few basic principles which are becoming fairly obvious. The outlines of streamlined supply systems for a possible future all-out war are taking shape. Weapons research and development in recent years have catalyzed modes of logistical thinking. As before in conventional wars, enemy strategy in future atomic warfare on land will be directed toward finding the most profitable targets. Defense strategy will be directed to eliminate these profitable targets—including avoidance of massed forces of men engaged in combat or in support operations such as food distribution, food preparation, and related activities.

"It is here that the food picture of the future begins to take shape. We must accommodate our rations and our feeding systems to the new doctrine of extreme dispersal. To do this we must reduce food tonnage, simplify the lines of supply over which food must travel, and eliminate to the extent possible all vast food storage and food preparation centers that in the very nature of things require a massing of support forces, and therefore a profitable target.

"Fortunately, conventional warfare has long been concerned with this objective of reducing food tonnage. Palatable concentrates and dehydrates are presently available to us in sufficient variety to compose an adequate meal. You are perhaps aware of the fact that dehydrated orange juice, green beans, fish sticks, and soluble coffee, potatoes, eggs, and other items have been brought to a high state of acceptability. Many other items have been substantially improved under the Quartermaster research and development program on dehydrated products. I have tried these items at various times and I can say that they compare most favorably with other forms of preserved food.

"Inspired by the requirements of possible atomic warfare, we are at work on dehydrated foods that will lend themselves to a completely dehydrated precooked meal. New items in addition to those that have shown themselves to be satisfactory will be required. Prospects for success are good--a compliment to the energy that has been devoted to attaining new and greatly improved techniques of drying. If we assume the desired

reduction in food tonnage is 50 percent--a percentage that has been suggested--we already have exceeded that percentage in the instance of many dehydrated and concentrated foods--and I mean palatable, nutritious, readily reconstituted dehydrated foods. In some foods, the weight reduction achieved runs as high as 80 percent.

"Besides reducing tonnage, we must simplify the lines of food supply. The far-ranging nuclear ships of the Navy, the long-distance bombers of the Air Force, and the fast-moving troops of the Army must be free of bulky and heavy paraphernalia. Our subsistence planning must be geared to the realization that in any future all-out war the equipment, as well as the labor, required to store and issue food must be kept to the barest possible minimum. One of the ways we hope to achieve this is through our current food irradiation program. In fact we have already demonstrated, theoretically at least, that irradiation preservation will permit a tremendous reduction of facilities required for proper storage of food.

"There is another potential benefit of irradiation I would like to mention. If we increase the burden on industry by requiring more highly-processed concentrated foods for use in combat areas, we must decrease to the extent possible the time, labor, and effort needed to provide food for noncombat areas. This probably means a greater dependence in noncombat areas upon fresh market produce. And it is in preserving and extending the storage life of fresh foods that our program of irradiation preservation of food has been particularly successful.

"The prospects for the widespread military use of foods preserved by irradiation are excellent. The current emphasis on the benefits of irradiation as a 'pasteurization' technique does not mean that we have sidetracked our interest in the possibilities of irradiation for long-term preservation. Investigations are continuing in this phase of the program, and we are definitely gaining ground.

"As I have said, we must reduce our subsistence handling and storage operations to the absolute minimum. We must find the lowest common denominator of both facilities and functions required to supply and feed this dispersed, flexible, mobile fighting force of the future. .."



Florida

FISHERIES RESEARCH, OCTOBER-DECEMBER 1955: The following are some excerpts from the Quarterly Report on Fisheries Research, December 1955, of The Marine Laboratory of the University of Miami.

Mullet Fish Sticks: The last taste tests were run on the mullet fish sticks. Briefly, fish sticks made of mullet were acceptable to many testers, but more people expressed a preference for cod or haddock sticks than for mullet sticks. The high fat content of mullet sticks will make it necessary to hold them for only comparatively short periods of time in frozen storage.

Shrimp Technology: ANTIBIOTIC ICES: With the work of the past quarter included, seven series of experiments have now been completed testing the effect of antibiotics on shrimp freshness. The latest experiments have tested aureomycin and terramycin frozen in ice, according to the new methods developed last year. As in the case of the dips, the antibiotic ices show definite improvement of quality of shrimp, in terms of bacterial counts and organoleptic criteria. The excessive formation of black spot remains a problem. In attempts to avoid this, four different ions were used in place of calcium (manganese, magnesium, cobalt and nickel), but with no success. Ice has now been made up, for use in the January experiments, avoiding the use of bivalent ions, and substituting methylcellulose and carboxy methylcellulose for the alginate carrier.

BLACK SPOT CONTROL: Another chemical has been tested as a possible control for black spot. This is butylated hydroxytoluene (Ionoi), a powerful antioxidant. Results were negative in the first test, but this may be due to the uneven distribution of the chemical through the ice block. The technique for distributing Ionol has been altered and the experiment will be repeated.

Commercial ice manufacture involves bubbling air through the water to be frozen. This produces a clear block, but may add enough oxygen to encourage black spot. Tests were run some months ago with ice made without the air being bubbled through it. Further work is being done on this, and results have been encouraging enough to cause some shrimp boats to use the new type ice.

The effectiveness of dipping newly-caught shrimp in dilute solutions of sodium bisulfite was established earlier as a black-spot control. Latest work has been to establish the amount of this chemical which remains in the muscle of shrimp dipped in the solution, and to measure the destruction of thiamine. The SO2--equivalent residual of the bisulfite has proven to be encouragingly low, in the order of 30 to 45 parts per million in both raw and cooked shrimp. This is compared to about 3,000 ppm. in dried apricots, about 1,800 ppm. in dried apples and about 1,200 in raisins. Thiamine destruction appears to be slight, which is also very encouraging.

Investigation is also under way on occasional lots of bisulfite--treated shrimp which turn yellowish or brownish. This may be associated with overexposure in the dip solution.

FRESHNESS TESTS: A final series of indole determinations were run in continuing attempts

to find a satisfactory chemical test for freshness of shrimp. This was the follow-up of the report made in November, suggesting that the simultaneous operation of three sets of apparatus, with a larger number of shrimp being used for the samples, might improve the consistency of results. This expectation was borne out and indole is thought to be useful as a laboratory test for shrimpfreshness.

<u>Small Shrimp Survey</u>: During the last quarter of 1955, four trips were made out of Key West in connection with the small shrimp study. Four of these were charter trips and the fourth one a shrimp boat pursuing its regular commercial-fishing operations.

Hauls were made on grounds expected to yield small shrimp. A standard shrimp trawl was used, except that the cod end was of smaller mesh than in general use, being of 1½-inch stretched mesh. In order to catch shrimp and fish which escape through the cod end, a cover bag of one inch stretched mesh was attached to the cod end. All three charter trips during the quarter used this mesh and gear arrangement. Altogether 23 hauls were made.



Unloading a commercial shrimp vessel with a conveyor system,

The amount of shrimp caught in each haul was recorded, as well as the amount and general composition of the trash. The amount of shrimp retained by the cod end and those caught in the cover net were recorded, and measurements made of the sizes of the individuals. Identification has been made of the fish making up the trash. Of interest is a small shrimp caught in the cover bag, of a different species from the commercial shrimp. The small species is Trachypenaeus constrictus. At present few, if any, are caught in commercial gears, but this unused shrimp is as big as some now used, especially in the canning and drying trade.

<u>Blue Crab:</u> This program has been concerned with the problem of helping Florida crab producers retain markets, particularly in the north, in the



Great Lakes Fishery Investigations

CHUB FISHERY NOT RESPONSIBLE FOR DECLINE OF LAKE MICHIGAN TROUT: The decline of Lake Michigan's trout fishery, which plunged from an annual catch of 6,500,000 pounds in 1946 to a mere 34 pounds in 1955, is due to the sea lamprey rather than to destruction of young lake trout by the chub fishery or to failure of natural reproduction, a study made by the Fish and Wildlife Service indicates. The study was made by Paul H. Eschmeyer, biologist for the Service. Overfishing as a reason for the decline was ruled out by earlier studies.

To further emphasize the decrease of lake trout in Lake Michigan, the research shows that in the first seven months of 1954 gill-net settings totaling 8,794,000 feet (or 1,666 miles) brought up only 326 trout and that in a four-months period in 1955 more than 1,400 miles of net caught only 8 trout.

The three possible reasons for the decline--(1) the destruction of young trout by the use of small-mesh nets by the chub fishermen, (2) the near or complete failure of natural reproduction, and (3) the sea lamprey--are discussed in turn.

The heavy loss of young lake trout through chub fishing activities had no adverse effect upon trout abundance, according to the report. During the period, 1935 to 1939, the number of small trout destroyed by chub fishing varied from 688,000 to 927,000. If such destruction had been detrimental to the abundance of trout, a serious decline in that abundance could have been expected during the 1939-1944 period. Yet during these years the abundance index varied from 100 percent to 126 percent. This index is based upon the 1929-1944 average. Conversely, in 1940-1944 chub fishing was less intense and destruction of trout was correspondingly lower. But just when the trout fishery should have benefitted by the decreased destruction, the fishery collapsed completely in the later 1940's.

Studies also showed that failure of natural reproduction first exerted a major influence in 1954, and that the enormous decline in abundance occurred well in advance of the time when failure of natural reproduction could have been a factor.

A study of the correlation between the size of lake trout and the percentage of individuals bearing sea lamprey scars and other studies in the field of lamprey depredations, plus the ruling out of the other possible causes, leads to the conclusion that the Lake Michigan trout have been brought to near extinction by the lethal attack of the sea lamprey.

The sea lamprey was noted in Lake Michigan as early as 1937. By 1946 it was spawning in great numbers in many streams tributary to Lake Michigan. Fish and Wildlife Service biologists who have been working on selective poisons and other methods of controlling the sea lamprey report considerable progress in their efforts.

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OPERATIONAL PLANS FOR SERVICE'S RESEARCH VESSEL "CISCO" FOR 1956: During the 1956 operational season of the U. S. Fish and Wildlife Service research vessel Cisco, a comprehensive survey will be made of the Saginaw Bay area of Lake Huron.

The objectives of the survey will be to study the species of fish inhabiting Saginaw Bay, their distribution, and relative abundance. In addition:

1. Determine the seasonal movements and summer distribution of the walleye and lake herring.

- 2. Measure and otherwise evaluate the physical or biological factors that may have contributed to changes in the composition of the Saginaw Bay fish population that have occurred in recent years.
- 3. Determine the conditions required for natural reproduction of important species of the Bay and factors that may influence the success of spawning, incubation, hatching, and juvenile growth.
- 4. Establish the occurrence and distribution of larval, fry, and yearling stages of species that may be important in influencing the status and structure of the fish population.



Cisco, research vessel of the Service's Great Lakes Fishery Investigations.

- 5. Establish measures that may be used as a base to follow future changes of the physical and biological conditions in Saginaw Bay.
- 6. Describe the current systems in Saginaw Bay and the adjacent portion of Lake Huron, and determine the amount of interchange between the bay and lake.

In the course of the survey, gill nets, otter trawls, and other nets will be used to sample the population (both adult and larval) of the Bay. All walleyes or yellow pike taken alive and in good condition will be tagged and released. Several types of tags will be tested for effectiveness. Additional scientific data will be collected for population studies; stomach contents and fish-food organisms; environmental factors such as water temperatures, water turbidity, chemical composition, and condition of the bottom; drift bottles will be released at regular stations along the route of the cruises; and routine plankton collection made at all hydrographic stations.

Gulf Exploratory Fishery Program

RED SHRIMP CAUGHT IN GULF OF MEXICO BY "OREGON" (Cruise 38): Large red shrimp (Hymenopenaeus robustus) were taken in all drags beyond the 200-fathom curve by the M/V Oregon during a three-week exploratory shrimp-trawling cruise in the northwestern and north-central Gulf of Mexico. A total of 41 drags and two hand-line stations were completed during the trip which ended on May 22. A total of 28 drags were made in depths of 100 to 300 fathoms and 13 in 30 to 60 fathoms.

Using 80-foot balloon and 100-foot flat trawls, catches ran from 90 to 210 pounds per three-hour drag in the area east of the Mississippi Delta as compared to catches of 5 to 30 pounds off the Texas coast. Catches in the 200- to 240-fathom range also included from 10 to 100 pounds of 50-count <u>Penaeopsis megalops</u>, a smaller deep-water shrimp. Catches of 300 to 500 pounds of scrap fish were common in both areas. Hake and whiting accounted for the bulk of the catch.

Catches of brown-grooved shrimp (<u>Penaeus aztecus</u>) ran from 2 to 22 pounds per hour using a 40-foot flat trawl at the 13 shallower-water stations. Following up reports of a "new" species of shrimp entering the fishery in the Mississippi Delta area, a series of six drags were made in 30 to 60 fathoms off Pass a Loutre.

Small numbers (from $\frac{1}{2}$ to 3 pounds) of 31-35 count "humpback" shrimp (Solenocera vioscai) were found mixed with the brown-grooved shrimp in the 30- to 45-fathom



M/V Oregon (Cruise 38).

drags. This species has been commonly taken in very small numbers in commercial catches off the Mississippi Delta area.

Severe gear losses due to bogging were encountered in the deep-water dragging, particularly in the northwestern Gulf. During the cruise three complete rigs were lost including bridle, doors, and trawl. Five additional rigs were badly damaged.

During the trip an uncharted rock "ridge" was found, orignating in the vicinity of 27 57' north latitude, 94 55' west longitude, and extending several miles in an

east-southeasterly direction. Echo-recorder tracings showed good indications of bottom fish along the entire ridge. On May 8 a series of hand-line stations at various points along its length yielded approximately 1,600 pounds of red snapper and 300 pounds of several species of groupers.



Maryland

OYSTER PROSPECTS BRIGHT ON SOME MARYLAND BARS: Lack of sufficient oyster set is one of the chief limiting factors in oyster production on many bars in the Chesapeake area. Certain oyster beds are known for the production of fat well-shaped oysters but seldom receive enough spat on them to replace the oyster populations as rapidly as the crops are harvested. These bars will usually yield only meagre crops that are far below their full capacity unless adequate supplies of young oysters can be introduced as seed. To a limited extent the State has been able to stimulate yields on such bars by planting seed, but this is expensive and available public funds are used primarily for planting shells where spat are likely to attach. Even if all such funds were used for planting seed on low-setting bars, only a small fraction of their potentially-productive areas could be planted. Thus the crop on unplanted bars may almost reach the vanishing point when setting fails over a long period of years. This has been the case on many good oyster-growing bottoms of the State where a marked reduction in yield has occurred.

Examinations of oyster bars early in 1956 in the Patuxent River have shown that the best sets for many years occurred during 1954 and 1955 on bars all the way up to the head of the oyster-producing area, a relatively short distance above the Patuxent River Bridge. Reports indicate that a similar condition exists on the upper Severn River bars and in parts of the South River area. Increased sets also occurred on the Eastern Shore side of the upper Bay. In the Patuxent, counts of about 200 per bushel of the 1954 set on natural cultch were found in the upper river together with a scattering of 1955 set. The 1954 set decreased gradually downstream although counts of over 100 per bushel were found on some bars in the middle section, ranging down to an average of approximately 50 per bushel in the lower river. The 1955 set was highest in the lower river except near the mouth and ranged up to around 200 per bushel. State shell plantings in the lower half of the River also received good catches, in one sample as high as 442 spat per bushel on 1955 shell. The set was not uniform but was quite general.

Counts made in the Patuxent during a period of more than ten years prior to 1954 have shown an average of less than 10 spat per bushel per year on natural cultch. On the other hand, the count for a good seed-producing area, such as St. Mary's River, often is 1,000 or more spat per bushel. Survival of spat in the Patuxent River has been quite good in the past. Hence it is expected that the marked increase in the quantity of spat now present on available cultch should be followed by a period of increased production from the River's natural rocks. It should be pointed out, however, that the extent of the set is limited by the available cultch and that cultch has become progressively scarcer as shell and cinder become covered by silt on depleted bars.

The set for 1954 and 1955 was something less than average over most other oyster bars in Maryland, especially in the lower or saltier oyster-producing areas. These years were both exceptionally dry, up to the August storms of 1955. The drought condition resulted in the salinity of the water at Solomons averaging about 25 percent above normal during the oyster-spawning season of the two years. Less detailed observations indicate that a similar rise in salinity occurred over most of the Chesapeake. This probably was even more marked in the uppermost oyster-producing areas where salinities usually are kept down by the flow of fresh water downstream.

A tentative theory of how this condition may have brought about the observed increased set follows: Tidal action in an estuary tends to move saltier water upstream near the bottom and this, when accompanied by a lessened dilution with fresh water during dry seasons, may have tended to concentrate more larvae than usual in the upper reaches of the River. Activity of oysters and the presence of tiny marine organisms upon which oysters and oyster larvae feed would also be affected by the rise in salinity. Resultant changes of this nature may have favored better production and survival of larvae and spat. The exact mechanism by which the better sets were brought about is not understood, however, and the association with the conditions caused by dry weather may be only a coincidence. Continued studies of the factors that influence oyster spawning and setting will be made and certainly any future occurrence of exceptionally dry years will be noted carefully in relation to the oyster setting pattern, according to the March 1956 Maryland Tidewater News of the Maryland Department of Research and Education.

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Experiments which were designed to test several methods of holding cultch for oyster set above the bottom have been tried this past season in Chincoteague Bay, Md. Results indicate that due to the high cost and scarcity of seed oysters it may be economically feasible to grow seed oysters above the bottom where enemies cannot gain access to them. This should insure better survival and higher quality in the seed oysters and so justify the cost of the operation. In the past the cost of seed oysters was low and the quantity was sufficient to meet the demand. Any method of producing seed which involved high labor costs was economically out of the question. In other countries where labor is cheaper similar methods have been used for many years with good results, the March 1956 issue of Maryland Tidewater News of the Department of Research and Education points out.

The shells which were used as cultch in Chincoteague Bay were put on metal trays or held in wire bags and placed so that they would be in the intertidal zone. Tidal amplitude averages about one foot in that part of the Bay. The results of this experiment indicate that the method could be successful commercially as far as receiving a set of oysters is concerned. The operation, however, was on too small a scale to obtain any cost data. The shells held in the wire bags or trays retained a set of oyster spat which was about sixteen times as great as that on the shells which were planted on the bottom directly beneath the suspended shells. This was tested in two areas of the Bay and the figure given is the lowest set obtained.

Several factors may contribute to the success of the suspended cultch, but certainly the fact that they were divorced from nearly all of their enemies is very important. Another important consideration is that none of the shells were in the mud. Both sides of the shells were available to receive the set of oysters. Another important point is that this method may be used to utilize good setting areas which may have a very soft muddy bottom which would not support shells planted there. Many potentiallygood setting areas are not now being used for the above-mentioned reason.

The investigation will be carried on during the 1956 season. The costs will be noted so that an accurate estimate of the per bushel cost of seed raised in this manner may be obtained. This will, it is hoped, give some idea to oyster planters of the feasibility of raising their own seed oysters on a commercial basis. It is expected that this year seed oysters will sell for \$1.35 to \$1.50 per bushel plus freight to the planting area. These prices leave a good margin for the labor and material involved in handling shells and making wire bags if some thought is given to devise economical methods of carrying out the operation. Some of the answers to the problem should be available after this summer's work so that the method can be evaluated. It is felt that at the present prices the work offers some promise of alleviating the problem of seed-oyster costs.



Massachusetts

REGULATIONS FOR WEIGHING, SORTING, AND CULLING FISH AT LANDING PORTS: Certain rules and regulations for the weighing, sorting, and culling of fish were adopted by the Massachusetts State Commissioner of Labor and Industries. The regulations, which became effective May 1, 1956, follow:

> General Laws, Chapter 94, Section 86 (Ter. Ed.) as Amended by Chapter 415 Acts of 1956

The Commissioner of Labor and Industries may adopt, amend or repeal, and shall enforce, all such reasonable rules and regulations, and orders thereunder, as may be necessary or suitable in relation to the weighing, sorting and culling of fish when landed from a vessel or boat. Whoever violates said rules or regulations or orders thereunder shall be punished by a fine of not less than fifty nor more than one hundred dollars.

Rules and Regulations Relative to the Weighing, Sorting and Culling of Fish Adopted by the Commissioner of Labor and Industries.

Cull of Fish in All Ports

Haddock Scrod haddock	Over $2\frac{1}{2}$ lbs. $1\frac{1}{2}$ to $2\frac{1}{2}$ lbs.
Cod, extra large Large cod Market cod Scrod cod	Over 25 lbs., incl. 10 to 25 lbs., incl. Over $2\frac{1}{2}$ lbs. to 10 lbs. $1\frac{1}{2}$ to $2\frac{1}{2}$ lbs., incl.
Lemon sole Blackbacks Medium blackbacks Small blackbacks	4 lbs. and over 2 lbs. to 4 lbs. 1 lb. to 2 lbs. Under 1 lb.
Grey sole Small grey sole	2 lbs. and over Under 2 lbs.
Yellowtails Dabs Small dabs	$\frac{3}{4}$ lb. and over 1 lb. and over Under 1 lb.
Pollock Scrod pollock	4 lbs. and over $1\frac{1}{2}$ to 4 lbs.
Large fluke Medium fluke Small fluke	4 lbs. and over 3 to 4 lbs. $1\frac{1}{2}$ to 3 lbs.
Large hake Medium hake Small hake	6 lbs. and over Over $2\frac{1}{2}$ to 6 lbs. $1\frac{1}{2}$ to $2\frac{1}{2}$ lbs., incl.

Cusk Scrod cusk Halibut, extra large Large halibut Medium white halibut Chicken halibut Snapper halibut Medium grey halibut Large mackerel Medium mackerel Small mackerel Tinker mackerel Tack mackerel Butterfish Small butterfish Redfish (ocean perch)

Small redfish (ocean perch) Whiting

Swordfish

Scallops

Baby swordfish

Over 3 lbs. $1\frac{1}{2}$ to 3 lbs. incl. Over 125 lbs. 60 to 125 lbs. 12 to 60 lbs. 7 to 12 lbs. Under 7 lbs. 12 to 60 lbs. $2\frac{1}{4}$ lbs. and over $1\frac{1}{2}$ to $2\frac{1}{4}$ lbs. 1 to $1\frac{1}{2}$ lbs. 1 to 1 lb. Under $\frac{1}{2}$ lb.

325 fish or less per 100 lbs. More than 325 fish per 100 lbs. 120 fillets or less per 10 lbs.

More than 120 fillets per 10 lbs. No cull but designated "round" or "h. & g.

Over 110 lbs. 110 lbs. and under

9 lbs. per gallon, no cull

Weighing of Fish

In all ports, an allowance shall be made for tare weight of $\frac{1}{2}$ lb. per bag on scallops. Tare weights of vehicles, barrels, boxes or other containing units shall be regularly taken. All weighing operations shall be in accordance with the Rules and Regulations established by the Director of Standards and Necessaries of Life $\frac{1}{2}l$.

In the Port of Boston, an allowance of five percent for ice and other foreign substance shall be made in bulk weighing, except in the circumstance where an abnormally large amount of ice is in the fish a percentage allowance may be mutually agreed upon by the buyer and the seller.

In the Port of Gloucester, on grey sole and dabs, an allowance for ice and other foreign substance of 10 lbs. per 250-lb. barrel of fish shall be made unless other allowance is mutually agreed upon by the buyer and the seller. No allowance to be made for ice and other foreign substance on groundfish.

In the Port of New Bedford, on groundfish and flounders, an allowance shall be made of 4 lbs. per 100-lb. box or basket for ice or other foreign substance.

Ernest A. Johnson,

Commissioner of Labor & Industries

1/ General Laws, Chapter 94, Section 176, "'Weight' in a sale of commodities by weight shall mean the net weight of all commodities so sold: and contracts concerning such sales shall be so construed: ..."



New York City

SUGGESTIONS FOR CRAB MEAT PACKERS: The Director of the Bureau of Food and Drugs of New York City's Department of Health in a letter addressed to fresh crab meat packers makes suggestions for shipping crab meat to New York City. The letter points out that fresh crab meat shipped to the City of New York

must conform to the bacterial standards prescribed in Section 163A of New York City's Sanitary Code. In order to meet these standards, it is absolutely essential that crab meat be prepared, handled, and packed under strict sanitary precautions in a plant that is certified by the state inspection authority controlling the crab meat industry in your State.

To prevent rise inbacterial content, it is also essential that the crab meat be adequately refrigerated from the period of packing to the time it reaches its destination and that delay be avoided between packing and shipment.



Pasteurizing crab meat in hermetically-sealed cans.

The following suggestions are made to aid in maintaining bacterial quality control during the long haul in shipments of crab meat to the City of New York.

1. Use shipping containers of sufficient size to provide maximum space for storage of ice.

- 2. Pack cans into barrels or other shipping containers in a manner that will allow spaces between the cans to facilitate thorough icing and re-icing all around can surfaces. Avoid overloading or stacking cans directly on top of each other.
- 3. Eliminate delays in time and additional handling by direct shipments from your plant to New York City instead of reshipments through another dealer.
- 4. Check your carrier's equipment relative to refrigeration or ability to maintain cold temperatures; also location of icing stations en route.
- 5. Request re-icing of your shipments in transit at suitable intervals, especially in warm and hot weather.
- 6. Arrange for direct deliveries of your shipments if possible without long delays resulting from consolidations or transfers of loads, lay-overs at transfer points, circuitous routing, etc.

It is well to bear in mind that attempts at savings in shipping costs per package is negligible in comparison with losses resulting from spoilage or increase in bacterial counts in the product due to inadequate refrigeration or icing during transportation.

* * * * *

SUGGESTIONS FOR TRANSPORTERS OF FRESH CRAB MEAT: At a recent meeting held at the New York City Department of Health with health officials of the Southern states which ship fresh crab meat to New York City, considerable discussion centered around methods of refrigeration used on vehicles during long hauls of shipments from the crab-meat packing plants to market destinations. It was decided that the City's Department of Health send a letter to every trucking and express firm before the coming warm weather season and point out the necessity for proper care during transportation.

The Director of the Bureau of Food and Drugs of New York City's Department of Health in the letter points out that fresh crab meat is a ready-to-eat food that is generally consumed without further cooking. Continuous adequate refrigeration is a very important factor in maintaining quality control. If it is not kept at a very cold temperature at all times from point of departure to point of destination, bacteria may multiply to enormous numbers and cause spoilage of the crab meat or food poisoning to the consumers. You are urged to alert your employees to take all precautions necessary to assure that crab meat be kept cold while transported in your carriers, the letter to the transportation companies continues.

The importance of refrigeration is being constantly stressed to the crab meat packers. However, the following suggestions to trucking and other transportation companies may aid in preserving quality during transportation:

- 1. Check amount of ice and salt carried to assure that it is adequate for the entire load. Check insulation for defects.
- 2. If mechanical refrigeration is used, check for proper working order and if adequate to maintain sufficiently low temperatures for the load carried. If necessary, supplement with dry ice.
 - 3. Precool vehicles during hot weather before loading.
- 4. Place loads in such a manner as to allow circulation of air around the shipping containers. Use of floor racks for this purpose is advisable.

- 5. Where ice is used for refrigeration, check drains to insure against stoppages. Plugs for ice bunkers should be tight-fitting.
- 6. Do not skimp on ice in warm and hot weather and see that all cans inside barrels and boxes are well re-iced. Arrange with packers for re-icing of their shipments en route.
- 7. Provide re-icing stations at suitable intervals along routes and make certain that stops are made for the purpose of re-icing.
- 8. Avoid the alleged practice of skipping re-icing stations and then re-icing just before arrival in New York City to mislead receivers.
- 9. Avoid long delays in transit caused by consolidations or transfer of loads, lay-over at transfer points, circuitous routing, etc.
- 10. Make employees aware of precautions to be taken during long hauls in hot weather when vehicles are subject to a great deal of heat over the highways.

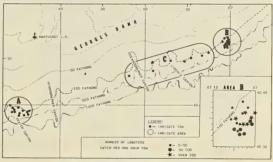


North Atlantic Fisheries Exploration and Gear Research

EXCELLENT CATCHES OF DEEP-WATER LOBSTERS BY "DELAWARE" (Cruise 19): Excellent catches of deep-water lobsters were made by the Service's exploratory fishing vessel Delaware. The 12-day cruise was completed with return of the vessel to East Boston on May 11. The purpose of the cruise was to evaluate the commercial fishing potential for deep-water lobster at this season.

Over 8,900 pounds of deep-water lobsters averaging 5 pounds each were taken by 41 exploratory tows of 1-hour duration. Gear used was a standard No. 41 otter trawl and catches ranged from a low of three lobsters per one-hour tow in the Veatch Canyon area to 211 per one-hour tow east of Lydonia Canyon. The largest catches were made in the 175- to 225-fathom range.

A total of 1,032 lobsters was tagged and released where caught. Ap-



M/V Delaware Cruise 19, April 30-May 11, 1956.

proximately 200 large egg-bearing females were turned over to the Massachusetts Division of Marine Fisheries for use in stocking inshore waters. In addition, two tagged lobsters were recaptured by the <u>Delaware</u> on May 5 and 6, both in the same locality as released. One was tagged November 19, 1955, and the other May 6, 1956.

During the cruise radio contact with the commercial trawler R. W. Griffin, \underline{Jr} , indicated that two tagged lobsters were recaptured in the vicinity of Veatch Canyon on May 10, 1956. One of these was tagged and released from the $\underline{Delaware}$ on January 26, 1956, and had moved approximately 90 miles westward along the edge of the Continental Shelf. The other was tagged and released from the $\underline{Delaware}$ on May 1, 1956, and was recaptured in the same area as released.

The <u>Delaware</u> left East Boston on May 21 for a 13-day trip (Cruise 20) to the Sable Island area South of Nova Scotia to continue studies of the deep-water distribution of ocean perch.



North Atlantic Fisheries Investigations

SURVEY OF HADDOCK EGGS AND LARVAE DISTRIBUTION CONTINUED BY ALBATROSS III (Cruise 73): Georges Bank, Browns Bank, and the Gulf of Maine were surveyed for haddock eggs and larvae by the Service's research vessel Albatross III during Cruise 73 (April 17-28). In addition, the temperature, salinity, and the general circulation pattern in the Gulf of Maine and Georges Bank area were studied.



U. S. Fish and Wildlife Service research vessel Albatross III.

Continuous plankton tows at the surface and 10 meters with Hardy Plankton Recorders, 241 bathythermograph lowerings, 120 salinity samples, and 20 surface tows with the standard meter net were made. Eighteen samples of eggs were hatched out for identification purposes and a total of 800 drift bottles were released throughout the area of the cruise.

The cruise provided collections of haddock, cod, sea crab, and rockling eggs plus haddock, cod, herring, hake, and sand launce larvae. Haddock eggs were found at all locations sampled with the net except in the central Gulf of Maine indicating that the spawning of this species extended over a much greater area than that observed during any previous cruises.

The widely-spread haddock eggs if successful in meeting the

vicissitudes of life in the ocean waters, may result in an abundant haddock yearclass and good haddock fishing on Georges Bank in 1959. If meteorological and hydrographic conditions are favorable during the coming months a strong yearclass will develop.

Future cruises of the <u>Albatross III</u> will follow the drift of these young fish in May and June and a census will be made in September after they have taken up life on the bottom and are no longer at the mercy of tide and current.

The Albatross III sailed on May 2 to study the effectiveness of different sizes of nylon mesh in releasing small unmarketable sizes of haddock on George Bank and Browns Bank.

* * * * *

SELECTIVITY OF NYLON COD ENDS TESTED BY "ALBATROSS III" (Cruise 74): To determine the selectivity of sizes of haddock with nylon cod ends of $4\frac{1}{4}$, 5, and $5\frac{3}{4}$ -inch meshes (between centers) was the purpose of Cruise 74 of the Service's research vessel Albatross III. The trip took place from May 2-May 10, 1956.

A total of 69 tows were made on Georges Bank using $4\frac{1}{4}$, 5, and $5\frac{3}{4}$ -inch nylon mesh cod ends and a 5-inch dacron cod end. An abundance of one- to six-year old haddock provided good catches for all four cod ends tested. A total of 69 tows were made of which 62 produced usable results. Approximately 26,000 haddock were taken and all were measured.

A summary of results is presented in the table. These can be considered only tentative because of the large quantity of data involved which cannot be completely analyzed at sea.

Both the nylon and dacron cod ends were of braided twine of single construction. Two gauges were used during the cruise: the ICNAF-type



Diagram of experimental cod end used to test selectivity.

pressure (wedge) gauge and the Scotch-type (longitudinal pressure) gauge. The mesh sizes given represent averages of measurements made with both gauges. No consistent difference between the two gauges was observed for the nylon twines when the Scotch gauge was set for 10-12 pounds and the ICNAF gauge was used with 8-10 pounds pressure. The Scotch gauge did give rather smaller measurements for the dacron cod end.

Cod End	No.	N	50% Points (cm.) Range for Indi-			Mesh Size (Intern Avg. for Avg. f			
(Size Between	of	Cover	Cod End	Total	vio	dual T	ows	All	the Last
Knot Centers New)	Tows				High	Low	Avg.	Meshes	10 Rows
$4\frac{1}{4}$ nylon	11	2,831	2,378	5,209	42	39	40	44 in.	$4\frac{7}{16}$ in.
5" nylon (1)	10	931	2,460	3,391	35	42	37	4 13 11	4 11 11
5" nylon (2)	12	3,254	2,143	5,402	49	41	44	47 "	51 11
$5\frac{311}{4}$ nylon	14	2,113	3,073	5, 186	56	41	46	54 "	51 11
5" dacron	15	2, 106	4,659	6,765	43	37	39	5 "	47 "

The rather large range in 50-percent points for individual cod ends was due to (1) changes in mesh size during the cruise; (2) random error caused by small catches for certain tows; (3) diurnal differences in escapement, the high selection points occurring in mid-day; and (4) other variables.

The division of the 5" nylon results into two parts is a result of reversing the cod end after the first 10 tows. This cod end had been used before causing the meshes to be enlarged at one end. Nylon (1) results are with the large meshes at the forward end, nylon (2) results are with the large meshes in the "normal" position, at the after end of the cod end.

Changing ends resulted in an increase of 7 centimeters in the 50-percent point, indicating that fish escape primarily through the after part of the cod end. This was further demonstrated by the improvement in the 50-percent-point-mesh size relationship when only the average of the last 10 rows of meshes in the cod end was used (see table).

The braided nylon provided a greater escapement of haddock than double manila cod ends of the same mesh size, in general, would be expected to provide.

Twenty large cod were returned alive to the laboratory to be used by the Retina Foundation for eye research. Some live haddock and flatfish were also returned.

The <u>Albatross III</u> sailed again May 16 (Cruise 75) for the purpose of sampling haddock eggs and to obtain hydrographic data.

* * * * *

HADDOCK EGGS AND LARVAE DISTRIBUTION (ALBATROSS III, Cruise 75): To determine the distribution of haddock eggs and larvae, temperature, and salinity, and the general circulation pattern in the Gulf of Maine, Georges Bank, and the Southern New England Banks was the purpose of Cruise 75 of the Service's research vessel Albatross III (May 16-29, 1956).

Approximately 3, 200 miles of continuous plankton tows were made at the surface and 10 meters with Hardy Plankton Recorders; 325 bathythermograph lowerings, 165 salinity samples, and 22 surface tows with the standard meter net were made; 18 samples of eggs were hatched out for identification purposes. A total of 1,068 drift bottles were released throughout the area.

Haddock, cod, plaice, rockling, whiting, and yellowtail eggs; haddock, cod, pollock, ammodytes, herring, hake, and butterfish larvae were found. Haddock larvae were found along the southern edge of Georges Bank and 60 miles south of Montauk Point, Long Island.

The Albatross III was scheduled to sail again on June 11, 1956, for the final egg and larval fish survey of the year.



North Atlantic Herring Research

VESSEL CHARTERED TO CONTINUE HERRING EXPLORATIONS AND GEAR RESEARCH: The program of exploratory fishing and gear development for the Maine herring started by the Service's vessel Theodore N. Gill in 1955 will be continued in 1956 by the chartered 62-foot Gloucester motor vessel Metacomet. The

Metacomet departed for its first cruise on May 9 and is scheduled to return May 18.

The objectives of the first

The objectives of the first cruise were to (1) make echosoundings along the Maine Coast and in the offshore waters to locate schools of herring that may be made available to the sardine fishermen, and (2) make trial sets with a one-boat midwater trawl when schools are located by the echo-sounder, in an attempt to develop a dependable method of sampling the schools located at various depths.

In case commercial-size schools of sardines are located, the size and the location of the schools will be broadcast to the

Metacomet, vessel chartered by the Fish and Wildlife Service to continue program of exploratory fishing and gear development for the Maine herring.

sardine fishermen over radio frequencies 2638 kc. and 2738 kc.

* * * * *

ECHO-SOUNDINGS AND SAMPLES OF HERRING TAKEN BY "METACOMET" (Cruise 1): Herring were located on the echo-sounder and samples taken by the midwater-trawl in Middle Bay part of Casco Bay and at Spruce Point, near Long Island in Penobscot Bay by the M/V Metacomet on its first cruise. This vessel,

which has been chartered by the U. S. Fish and Wildlife Service to continue exploratory fishing and gear development for the Maine herring started by the Service's vessel <u>Theodore N. Gill</u> in 1955, left port on May 9 and returned on May 18. The samples of the fish taken were 0-year-class herring brit from last autumn's

spawning. Sounder traces similar to those in Middle Bay were also recorded in New Meadows River.

Fish were located on the echo sounder on May 9 and May 11 near Portland Head and on May 11 and May 16 near the Portland Lightship. These soundings were scattered and small. The midwater trawl was not set at these points due to rough seas.

Small traces of schooled fish, apparently herring, were recorded in St. Andrews Bay (Passamaquoddy Bay) during the evening and night of May 13. The largest tracings were recorded the first things the school of th

N. II.

M/V Metacomet (Cruise 1).

near Ministers Island and McAnns Head.

Widely-spaced scattered traces were recorded between the Portland Lightship and Boon Island on May 16.

Small scattered schools were also recorded near Race Point, Cape Cod, on May 18.

During this cruise the coastline of the Gulf of Maine was surveyed with a recording-type echo-sounder along the course lines shown in the diagram. This was done in an attempt to locate populations of sardine-size herring. No such schools were located and positively identified. However, the schools sounded in Passama-quoddy Bay and near the Portland Lightship appeared likely to be herring of sardine size.

A run was made to the Cape Cod area to test the midwater trawl on larger herring. During the one day and night spent there no schools in suitable position for trawling were located. The herring in this area appeared to be close in near the beaches.

C. Miles

North Pacific Exploratory Fishery Program

EXPERIMENTAL MIDWATER TRAWLING TO BE TRIED BY "JOHN N. COBB" (Cruise 27): Experimental midwater trawling is being tried by the Service's exploratory fishing vessel John N. Cobb on Cruise 27 which started from Seattle on May 14. On this six-week cruise several sizes of midwater trawls, both nylon and cotton, will be tested, ranging from a 30-foot to 50-foot square opening at the mouth. These nets were made at the Service's gear research station at Coral Gables, Fla., where underwater television and skin divers were used to observe the action of the gear under actual towing conditions.

Arrangements were made for gear experts from the Biological Station of the Fisheries Research Board of Canada at Nanaimo, B.C., to join the $\underline{\text{John N.}}$ Cobb for part of the cruise to try the successful Canadian midwater herring trawl in offshore waters and to compare the operation of the Canadian trawls with those furnished from Coral Gables. A biologist from the trawl-fish division of the State of Washington Department of Fisheries was also scheduled to participate.

In recent years midwater trawls have been used successfully in Europe and in British Columbia for herring. The $\underline{John\ N}$. Cobb will try to determine if fish such as Pacific ocean perch, cod and others which spend at least part of their time off the bottom can be efficiently taken by midwater trawling. Special attention will be given to rocky bottom areas off Washington and Vancouver Island which are too rough for bottom trawls.

A "Sea Scanar" will be used to locate schools of fish at middepths. To keep the trawl at proper depth, a new telemetering instrument developed at the University of Miami Marine Laboratory under contract with the Service will be employed. The instrument attaches to the trawl or trawl cable and sends out continuous battery-activated sound impulses to a hydrophone streamed by the vessel. Depth of the trawl is calculated from the frequencies of the signals received.



Pacific Halibut Fleet Began Fishing May 20

Although the International Pacific Halibut Commission in its regulations for the 1956 North Pacific halibut season set May 12 as the opening date, reports from the



Landing a halibut aboard a West Coast long-liner.

fish for alternating periods of seven days.

West Coast indicated that the halibut fleet did not sail in order to begin fishing by that date. In an effort to level off some of the heavy landings that occur on some days, fishermen of vessels fishing out of Puget Sound, British Columbia, and Alaska ports voted to delay actual fishing for eight days or until May 20.

The fishermen's unions also voted that (1) halibut vessels carrying three or more men would tie up for seven days between trips to the grounds and (2) small vessels carrying either one or two men will be permitted to fish for 14 days to begin the season and then tie up and

However, although most of the North Pacific halibut fleet did not begin fishing until May 20, small amounts of halibut caught by independent vessels which are not a party to the agreement or caught incidentally to other fishing were expected to reach port early in the week of May 14.



Pacific Oceanic Fishery Investigations

SPRING ABUNDANCE OF ALBACORE TUNA NORTH OF HAWAIIAN ISLANDS CHECKED BY "CHARLES H. GILBERT" (Cruise 27): Studies of potential albacore tuna fishing grounds by the research vessel Charles H. Gilbert of the Service's Pacific Oceanic Fishery Investigations have been extended so far up into the North Pa-

cific that observations of whales and fur seals at the more northern fishing stations have become

commonplace.

There was some surprise, however, when the Charles H. Gilbert, which returned May 4 from a 2-month cruise in the area north of Midway Island,



brought back 4 small salmon. The salmon, which were estimated to weigh about one pound each, were caught in gill nets set to capture albacore tuna at about 41° N. latitude. These fish will be sent to the Pacific Salmon Investigations at Seattle, Wash., for study.

This cruise of the vessel was planned to check the spring abundance of the albacore north of the Hawaiian Islands, as part of a continuing year-round program of study of the distribution of this valuable wide-ranging tuna species. Experimental fishing was done with long lines, gill nets, and trolling lines along the albacore

(I)-# - GILL-NET STATION O - PLANKTON STATION -A - LONG-LINE STATION. . - NIGHT-LIGHT STATION

Charles H. Gilbert Cruise 27 (3/17/56-5/4/56).

zone between 180° and 165° W. longitude as far as 42° N., an area which is centered roughly north of Midway Island. Albacore appeared to be scarce in the area at this season, but small numbers were taken on all the types of fishing gear used. Those captured in the gill nets and on trolling lines weighed 7-8 pounds each; the fish taken at greater depths on the long line weighed about 40 pounds each.

Plankton was sampled on the fishing grounds, and the scientists aboard reported that this basic fish food appeared to be somewhat more abundant in the western part of the survey area. Large squid, weighing 2-3 pounds, were also captured on the western survey section.

The weather was rough throughout much of the cruise, and the vessel rode out one storm with winds over 70 miles an hour.

Five long-line stations were fished along 180° longitude between 28° N. and 36° N. latitude in waters with surface temperatures ranging between 57.7° F. and 69.0° F. and two stations along 163° W. longitude between 32° N. and 34°30° N. latitude, in 60.8° F. and 63.0° F. surface temperatures. Only one albacore (57 pounds) was taken. This catch was made at the northernmost station at 36°08′ N., 179°55′ W. in 57.7° F. water. The remaining long-line catch consisted of 35 great blue sharks, 1 mako shark, 9 lancetfish (Alepisaurus sp.), 2 broadbill swordfish, and 2 dolphin (Coryphaena hippurus).

Eleven gill-net stations were occupied during the cruise. The gear consisted of 12 shackles of nylon netting on loan from the Pacific Salmon Investigations (PSI) in Seattle, Wash., and 1 shackle of POFI nylon net. Each of the 12 shackles of the PSI nets measured 20 feet in depth and 300 feet in length and the mesh sizes ranged from $2\frac{1}{4}$ " to $5\frac{1}{4}$ " stretched measure. The POFI net had 7" mesh, was 30 feet deep and 300 feet in length. The nets were set at dusk and left to drift free of the vessel during the night. They were retrieved at daybreak.

Albacore were taken at two gill-net stations. One station at $33^{\circ}45^{\circ}N$., $176^{\circ}57^{\circ}W$. yielded 6 albacore (6-12 pounds each) in 61.8° F. water and the other station at $33^{\circ}49^{\circ}N$., $170^{\circ}32^{\circ}W$. yielded 3 ($10^{\frac{1}{2}}$ -, 11-, $12^{\frac{1}{2}}$ -pound) fish in 62.3° F. water. Five of the total of 9 albacore were taken on the $5^{\frac{1}{4}}$ "-mesh nets and four on the $4^{\frac{1}{2}}$ "-nets. All of the fish were merely tangled on the tail or fins rather than gilled. One albacore was observed slipping off the net while the gear was being hauled.

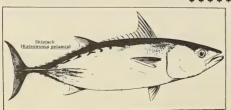
Two net stations were occupied in 50° F. and 50.7° F. waters and both resulted in the capture of small sockeye salmon (Oncorhynchus nerka). At $41^{\circ}28^{\circ}$ N., $165^{\circ}18^{\circ}$ W. (50° F. surface temperature) 3 salmon (36.1, 39.5, and 40.0 cm. fork length) were taken close together on a $4\frac{1}{2}$ "-mesh net. Another salmon, 37.6 cm. in length, was taken at $41^{\circ}30^{\circ}$ N., $164^{\circ}33^{\circ}$ W. (50.7° F.) on a $3\frac{1}{4}$ "-net. Allof the salmon were gilled. The last fish taken was alive when the nets were retrieved.

Two amberjacks (Seriola dumerili) were taken at $32^{\circ}46^{\circ}$ N., $176^{\circ}42^{\circ}$ W. in 62.5° F. water. They were taken on a $5\frac{1}{4}^{\circ}$ -mesh net. Additional gill-net catches included: 1 small broadbill swordfish, 6 pomfrets, 1 flying fish, 1 pilotfish, 36 great blue sharks, 2 mackerel sharks, and 92 cuttlefish.

Surface trolling proved to be very unproductive in the areas surveyed. In 1,598 line-hours of direct trolling at 6.0-7.0 knots, only 7 albacore were taken. These were taken at 32 $^{\circ}$ 08' N. and at 32 $^{\circ}$ 20' N. on 179 $^{\circ}$ 58' E., and at 32 $^{\circ}$ 00' N., 175 $^{\circ}$ 17' W., in surface temperatures between 63.0 °F. and 64.5 °F. These figh weighed between 11 and 14 pounds. Two skipjack were taken at 29 $^{\circ}$ 39' N., 161 $^{\circ}$ 52' W. in 70.2 °F. water while trolling at a vessel speed of about 8.5 knots. The fish weighed $7\frac{1}{2}$ pounds each. There were no visible signs of the presence of a school of fish when these skipjack were caught. In addition, 9 dolphin were taken.

A total of 6 albacore tuna were tagged and released with the California-type plastic tube tags.

Thirteen night-light stations were occupied in waters ranging in surface temperatures from 50.0° F. to 68.5° F. Saury (<u>Cololabis saira</u>) were observed at stations with water temperature between 57° F. and 64° F. with the greatest numbers occurring between 60° F. and 62° F. However, the species were not abundant at any of the stations.



SKIPJACK TUNA SPRING DISTRIBUTION NORTH OF LEEWARD ISLANDS SURVEYED BY "JOHN R. MANNING" (Cruise 30): A survey of the bait resources of the Leeward Islands and ascertaining the abundance of skipjack tuna to the north and west of the Hawaiian Islands during the preseason period was the purpose of the month-long (March 15-April 20) cruise of the research vessel John R. Manning, operated by the Service's Pacific

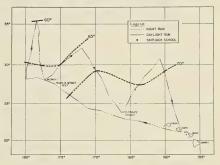
Oceanic Fishery Investigations. Moderately-abundant stocks of bait were found in the Leeward group, but there was a dearth of skipjack tuna schools in the area covered. This was somewhat surprising as earlier cruises, incidental to studies on albacore tuna, had detected surprisingly large numbers of skipjack during midwinter.

Direct trolling with 6 lines showed a lack of skipjack in the waters north of the Leeward Islands as only two schools were positively identified as skipjack. These schools, one at 31 06 N., 173 26 W. and the other at 29 44 N., 170 10 W. were observed only after fish struck the trolling lines. Both were small schools and were composed of 10-lb. and 4-lb. skipjack respectively, and were found in water with surface temperature of 68 F. Every

attempt at fishing the schools with live

bait failed.

There was a general lack of fish in the northern area scouted, and besides the two skipjack schools, only one other dolphin school and two bird-accompanied schools were encountered; the latter schools were unidentified. Seven other fish schools were seen in Hawaiian waters (within 200 miles from land) and these were one dolphin, 2 skipjack, and 48 unidentified schools. Two skipjack and 17 dolphin were caught on the trolling lines, and most of the latter were taken north of Oahu.



John R. Manning Cruise 30 (3/15/56-4/20/56).

A thorough bait survey of French
Frigate Shoals, Pearl and Hermes Reef, and Midway Island was conducted. Bait surveys at the three different localities showed that the Hawaiian silverside or iao (P. insularum) was the predominant and most readily-caught bait species. This species was found in equal abundance at Sand and Eastern Islands of the Midway Island group where 217 and 246 buckets of iao were seen respectively. Among the six southern islands visited at Pearl and Hermes Reef, Seal Island was the most promising and 140 buckets of iao were observed there. At French Frigate Shoals an estimated 90 buckets of iao were seen at East Island and none or only small amounts of bait was observed at the other northern islands, extending from Tern to Little Gin I. Live bait for fishing purposes was taken from Pearl and Hermes Reef and Midway Island but only small samples of bait for length frequency and maturity studies were caught at French Frigate Shoals.

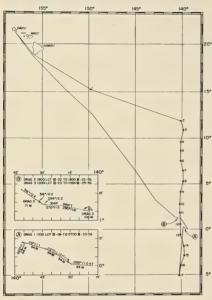
No skipjack or other tuna were available for tagging. Environmental data were collected in the area of the skipjack fishery adjacent to Oahu at the beginning and end of the cruise by means of BT casts and double-oblique 60-meter plankton tow with the 1-meter net; surface salinity and phosphate samples were also taken.

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OCEANOGRAPHY AND BIOLOGY ALONG THE EQUATOR STUDIED BY "HUGH M. SMITH" (Cruise 33): Study of the oceanography and biology of waters along the equator, about 1,000 miles south of Hawaii, was the purpose of the one-month cruise by the research vessel Hugh M. Smith of the Service's Pacific Oceanic Fishery Investigations. The vessel returned to port April 20.

On this cruise the vessel operated in an area where previous investigations by Fish and Wildlife Service ships have indicated that there is a considerable movement of water from the depths up to the surface. This upwelling brings fertilizing

chemical substances up into the sunlit layer of the ocean and results in a rich growth of minute plant and animal life--the plankton--to feed the small fish and squid which in their turn support the large stocks of tuna in the area.



Hugh M. Smith Cruise 33 (3/2/56-4/1/56).

The temperature and chemical content of the water, the speed and direction of the ocean currents, and the abundance of plankton were studied in a 1,000-mile strip of ocean which spans the equator to the southeast of Hawaii. Preliminary results indicate that the upwelling of the deeper cooler waters at the equator was more pronounced than it had been at the time of earlier cruises. Water temperatures near the equator were found to be lower, and the abundance of plankton in the surface waters was considerably higho er. The results of fishing cruises by Fish and Wildlife Service vessels scheduled to be carried out in this area this summer will show whether or not these apparently favorable conditions will produce a corresponding abundance of tuna.

The scientific party aboard the <u>Hugh M. Smith</u> also made two special studies at the equator and at 1 N. latitude to discover the speed at which the sea water was flowing away from the area of upwelling near the equator. In this work drags were hung deep in the water from floats, which were then followed by the ship to trace their course and speed. The objective of these studies is to find out where a drifting mass of fertile water, with its freight of developing fish food,

is likely to be when it becomes a good feeding ground for tuna, and thus ultimately to be able to predict where the tuna fishing will be good at any given time.

Only two night-light stations were occupied while tracking the drags and only one of these yielded fish. The scarcity of fish may have been due either to the large schools of squid and/or white-tipped sharks (1 to 7) which were present at all times.

Only eight fish schools were sighted, of which three were identified as skipjack tuna and the remainder unidentified. Five were sighted between 0°28' N. and 5°00'S., one at 12°59' N., 149°33' W., and one southwest of Maui on the return voyage.

The total catch on the trolling lines consisted of two dolphins (Coryphaena hippurus).

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1955/56 SAMPLING PROGRAM ON EQUATORIAL TUNA COMPLETED: The year-round equatorial tuna sampling program begun in March 1955 was completed in February 1956. The abundance of yellowfin tuna continued to be low during the first months of 1956. The highest catch rates were observed close to the islands, particularly those to the north of the equator, i.e., Palmyra and Kingman Reef. Long-line catches made in 1955 at the same time of year and in the same area as a United States commercial fishing venture in 1954 showed comparatively low catch

rates. This may be related to sea surface temperature conditions which at Christmas Island were lower than usual throughout 1955 with the trend continuing during January and February 1956. Tagging of viable yellowfin for migration studies continued. To date over 1,000 yellowfin have been tagged in this area.

The analysis of these year-round cruises has begun. One interesting aspect of the data is that maximum fishing depth, determined by chemical sounding tubes attached to the deepest hooks of long-line gear, shows considerable variation with area and time of year. Knowledge of this variation is important, for the deeper hooks on long-line gear have the higher catch rates.

The catch rates in the open ocean were consistently below 2 yellowfin per 100 hooks. Those very close to the islands averaged about 3 yellowfin per 100 hooks with a range of 1 to 13. Previous years showed a seasonal trend in abundance with higher catch rates during July through September, but this trend was absent in 1955.



Public Eating Places Survey

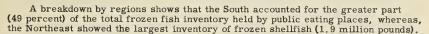
FROZEN FISH AND SHELLFISH HELD IN COLD STORAGE BY PUBLIC EATING PLACES: It is estimated that during the period May 25-June 2, 1955, public eating places were holding 4.7 million pounds of frozen fish and 5.4 million pounds of frozen shellfish in freezers or cold storages, or a total of 10.1 million pounds

of frozen fish and shellfish, according to the results of a sample survey conducted by the U.S. Bureau of Census for the U.S. Fish and Wildlife Service with funds provided by the Saltonstall-Kennedy Act of 1949,

The breakdown of this total of 10.1 million pounds by types of establishments shows that 57 percent or 5.8 million pounds were held by restaurants as compared with an inventory of 1.3 million pounds for cafeterias and about 800,000 pounds for drinking places, lunch counters, and refreshment stands (see table).

The average frozen fish and shellfish inventory per eating place for the United States was about 49 pounds with a range of 55 pounds for the average for

restaurants to 11 pounds for the average for drinking places, lunch counters, and refreshment stands.



As might be expected, when public eating places are grouped according to their reported total annual sales, the holdings of fish and shellfish per establishment varied directly with total sales. Eating places in the \$100,000 or more category averaged about 366 pounds of frozen fish and shellfish in cold storage, compared with less than 8 pounds in the less than \$10,000 annual sales size group.

This study on total cold-storage inventory of frozen fish and shellfish in eating establishments is one part of a broader study of fish and shellfish consumption characteristics in public eating places. The findings are based on a nationwide scientific sample survey of approximately 4,500 establishments during the week of May 25-June 2, 1955.



Frozen Fish and Shellfish Cold-Storage Stocks Reported by Public Eating Places Serving Fish or Shellfish (Estimated)									
	Tot		Fis		Shell	risn .	Es	ntory Per	
	Quantity	Percentage of Total	Quantity	Percentage of Total	Quantity	Percentage of Total	Total	Fish	Shellfish
United States Total	Million Lbs.	100.0	Million Lbs.	100.0	Million Lbs. 5.4	100.0	48.5	Pounds 22.6	25.9
Region: Northeast North Central South West	2.7 1.8 3.8 1.8	26.7 17.8 37.7 17.8	0.8 1.0 2.3 0.6	17.0 21.3 48.9 12.8	1.9 0.8 1.5 1.2	35.2 14.8 27.8 22.2	39.7 30.2 82.8 52.2	11.8 16.8 50.1 17.4	27.9 13.4 32.7 34.8
Type of Establishment: Restaurants Cafeterias Restaurants or Cafeterias in Hotels	5.8 1.3 2.2	57.4 12.9 21.8	2.3 1.1 0.8	48.9 23.4 17.0	3.5 0.2 1.4	64.8 3.7 25.9	54.9 30.2 14.4	21.8 25.6 5.2	33.1 4.6 9.2
Drug or Proprietary Stores with Fountain Other1/	0.8	7.9	0.5	10.6	0.3	- 5.6	10.9	6.8	4.1
City Size: 500,000 or more 100,000 to 499,999 25,000 to 99,999 2,500 to 24,999 Less than 2,500	3.0 1.3 1.2 1.7 2.9	29.7 12.9 11.9 16.8 28.7	1.5 0.4 0.5 0.7 1.6	31.9 8.5 10.6 14.9 34.0	1.5 0.9 0.7 1.0	27.8 16.7 13.0 18.5 24.1	70.4 49.8 43.8 42.6 40.2	35.2 15.3 18.2 17.5 22.2	35.2 34.5 25.5 25.1 18.0
Sales Size: \$100,000 or more \$ 40,000 to \$99,999 \$ 10,000 to \$39,000 Less than \$10,000 N↑ Reply	5.6 1.8 1.6 0.7	55.4 17.8 15.9 6.9 4.0	2.6 0.7 0.8 0.4 0.2	55.3 14.9 17.0 8.5 4.3	3.0 1.1 0.8 0.3 0.2	55.6 20.4 14.8 5.5 3.7	366.1 72.6 25.6 7.6 29.0	170.0 28.2 12.8 4.4 14.5	196.1 44.4 12.8 3.3 14.5
1/ Inchr'es drinking places, lunch counters, and r Note: Detail does not necessarily add to totals, b storage at the time the report was completed for	ecause of rounding,	Above data represe in the survey (some	nt estimates of the ni time during the perio	umber of pounds of d May 25-June 2, 19	frozen fish and shell 955).	fish held in cold			

* * * * *

SURVEY INDICATES FISH AND SHELLFISH DINNERS MORE PROFITABLE: Public eating places make as much or more profit from a serving of fish and shell-fish as from a serving of steak, roast beef, roast pork, or chicken. This is the opinion of 64 to 69 percent (depending on the item compared) of managers or opera-



tors of 208,000 public eating places distributed throughout the United States which serve fish or shellfish and other foods. These findings are based on a scientific sample of 4,500 establishments, representing all public eating places in the United States. About 40 percent of the eating places estimated that more profit was made from a serving of fish and shellfish than from a serving of steak, while about 29 percent indicated the profit was the same. Similar percentages were obtained for roast beef, roast pork, and chicken, according to a survey made in May 1955 by the U.S. Bureau of the Census under contract to the U.S. Fish and Wildlife Service.

The opinions on profit per serving were obtained without regard to variations in size or price of a serving, or other factors which might offset profits. These facts are of importance to the fishing industry and proprietors of public eating places because they indicate that increased sales of fish and shellfish may lead to increased profits for public eating places.

Information obtained from the same survey also shows that of the total number of main-dish meals served in public eating places during the survey week, only 17 percent were fish and shellfish meals.

Final results of the survey, which is being financed by funds provided by the Saltonstall-Kennedy Act of 1954, are scheduled for publication later in 1956.

Co

Saltonstall-Kennedy Act Fisheries Projects

FISHERY ADVISORY GROUP RECOMMENDS CONTINUANCE OF PROGRAM: The American Fisheries Advisory Committee, at its third meeting in Long Beach, Calif., on May 1 and 2, went on record for the continuance of a balanced program of technological, economic, market development, and biological research and serv-

ices through an enlarged and extended Saltonstall-Kennedy Act as the best way to aid the domestic fishing industry, Under Secretary of the Interior Clarence A. Davis stated May 17.

Established under the terms of the Saltonstall-Kennedy Act, which was passed in 1954 to promote increased production and marketing of domestic fishery products, this group meets periodically to advise the Secretary of the Interior on the various research and marketing activities which the Fish and Wildlife Service is conducting under the terms of the Act.

Assistant Secretary of the Interior Wesley A. D'Ewart,



American Fisheries Advisory Committee. Left to right, seated: Lawrence W. Strasburger, New Orleans, La.; H. F. Sahlman, Fernandina Beach, Fla.; Alphonse J. Wegmann, Pass Christian Isles, Miss.; Arnie J. Suomela, Asst, Director, Fish & Wildlife Service; Wesley A. D'Ewart, Asst, Secretary, Department of the Interior; John L. Farley, Director, Fish & Wildlife Service; Harold R. Bassett, Salisbury, Md.; Lawrence Calvert, Seattle, Wash, James S. Carlson, Boston, Mass.; Moses B. Pike, Eastport, Me.; standing: Norman B. Wigutoff, Exec. Secretary to the Committee; Dr. Lionel A. Walford, Chief, Branch of Fishery Biology, Fish & Wildlife Service; Thomas F. Sandoz, Astoria, Oreg.; J. Richards Nelson, Madison, Conn.; Arthur Sivertson, Duluth, Minn.; Paul Thompson, Asst, Chief, Branch of Fishery Biology, Fish & Wildlife Service; Donald P. Loker, Terminal Island, Califf.; Leon S. Kenney, St. Petersburg, Fla.; A. W. Anderson, Chief, Branch of Commercial Fisheries, Fish & Wildlife Service; PavidH, Hart, CapeMay, N.J.; R. T. Whiteleather, Asst, Chief, Branch of Commercial Fisheries, Fish & Wildlife Service; Mark L. Edmunds, Garibaldi, Oreg.; Arthur H, Mendonca, San Francisco, Calif,

who is chairman of the Advisory Committee, served as presiding officer during the two-day meeting. In his opening remarks Secretary D'Ewart reaffirmed the Department's determination to give all possible aid to the industry.

A report on accomplishments since the last meeting in September 1955 was presented by Fish and Wildlife Service Director John L. Farley; A. W. Anderson, Chief, Branch of Commercial Fisheries; and Dr. L. A. Walford, Chief, Branch of Fishery Biology.

The Committee commented favorably on the program so far undertaken but urged expansion of the activities through continuance of the Act and the provision of a substantial increase in the funds which are available annually. At present the limit of expenditures in any one year is \$3 million.

The Committee discussed a number of broad problems on production and marketing of domestic fishery products revolving essentially around two major points.

First, the problem of how to increase fish production to keep abreast of population growth so as to maintain or increase the present per capita consumption of fish came in for considerable attention. The Committee recommended market studies to determine areas of low consumption, as well as promotional campaigns, development of new products, and improvement in quality to aid in raising the present per capita consumption figure of about 10 pounds. Emphasis on exploration of new fishery resources and the development of more efficient gear to increase production was also stressed.

Secondly, the Committee also discussed the need for a well-rounded long-range program of biological research directed toward understanding the causes of fluctuations in fishery stocks in order to explain them, to predict their occurrence, and to use such understanding for the benefit of the fishery industries.

While in Long Beach the members of the Committee had an opportunity to visit the world's largest tuna cannery at Terminal Island where they observed tuna canning, from the unloading of the vessels to the finished product.

The next meeting of the Committee will be held in New Orleans, La., in January 1957.

Note: Also see Commercial Fisheries Review, April 1956, p. 21.



Shrimp

BETTER INSULATION OF SHRIMP VESSEL HOLDS NEEDED: Shrimp vessel fishing costs may be cut by reducing excessive ice consumption through the proper insulation of holds, according to an engineering study made for the U.S. Fish and Wildlife Service. Careful insulation of the holds, the study revealed, may reduce the consumption of ice in the hot summer months by as much as 700 pounds every day the vessel is at sea.

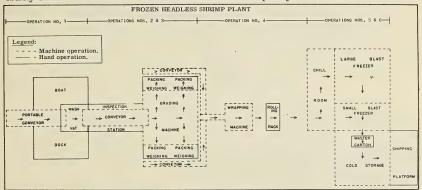
A balance must be struck between conserving ice and bathing the shrimp in the holds with water from the melting ice. Three inches of insulation on the hull and four inches on the deck and engineroom bulkheads appears to approximate this balance. An additional inch is recommended for steel hulls. Too heavily insulated holds will save on ice, but may result in the formation of "black spot" on the shrimp shell when the water film from melting ice is inadequate to reduce direct access to oxygen from the air.

The study was made by fishing methods and gear specialists E. Isaac Camber and Gordon C. Broadhead, employed by Harwell, Knowles & Associates, Coral Gables, Fla. It was financed by funds made available under the Saltonstall-Kennedy Act of 1954.

* * * * *

IMPROVED PLANT LAYOUT CAN CUT COSTS IN FROZEN SHRIMP PACKING PLANTS: Frozen shrimp packing costs can often be cut by modifying plant layout. Man-hours required to perform substantially the same operation vary as much as 90 percent between plants, according to an engineering survey in the Gulf Area made by the First Research Corporation of Miami, Fla., under the supervision of the U. S. Fish and Wildlife Service. The survey was financed by funds made available under the Saltonstall-Kennedy Act of 1954.

In a special study of freezer-room facilities, the engineers found that more economical operation resulted from dividing the freezing area into large and small freezing rooms. This arrangement, with a prechilling area, provides greater flexibility in the relation of workload to total freezer capacity.



Model engineering layout plan of a frozen headless shrimp plant,

A synthesized plan for a model plant layout (see schematic diagram) was developed for maximum efficiency using equipment and machinery in common use in the industry. In many cases, the adoption of some phase only of the synthesized layout plan offers real savings in man-hour costs.

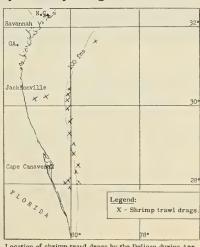


South Atlantic Exploratory Fishery Program

DEEP-WATER RED SHRIMP CAUGHT
BY "PELICAN" (Cruise 2): In April, deepwater exploratory shrimp trawling by the
exploratory fishing vessel <u>Pelican</u> extended from Cape Canaveral to off Savannah in
depths of 138 to 250 fathoms. All drags
were made with a 40-foot flat shrimp trawl
using a single trawling warp and bridle.
The <u>Pelican</u> is under charter by the U. S.
Fish and Wildlife Service and is exploring
for deep-water shrimp with funds provided
by the Saltonstall-Kennedy Act of 1954.

Between Cape Canaveral and St. Augustine seven 4-hour drags in depths of 150 to 212 fathoms caught 20-30 count red shrimp at rates of about 40 pounds a drag. The largest catch (70 pounds) was made in 150 to 156 fathoms off False Cape, Fla.

North of St. Augustine increasingly rough bottom was encountered. Three of four drags made off Jacksonville resulted in gear damage and no shrimp catch. The other drag caught 45 pounds of 16-20 count red shrimp.



Location of shrimp trawl drags by the Pelican during Apr. 1956.

A depth-recorder survey in deep water from Jacksonville to Savannah revealed apparently untrawlable bottom. Off Savannah a clear spot was located in 182 to 250 fathoms and a 1-hour drag caught 13 pounds of red shrimp.

A series of seven shallower drags was made off Cape Canaveral and Jackson-ville in depths of 13 to 26 fathoms. The only catch containing commercial shrimp species was made at night in 13 fathoms off Jacksonville Beach. About $1\frac{1}{2}$ pounds of large pink-spotted shrimp were taken during the 40-minute drag.



Sport Fisning and Hunting

<u>NATIONAL</u> <u>SURVEY</u> <u>INTERVIEWS</u> <u>COMPLETED</u>: Field work on a survey that started January 7, 1956, which will give America its first authentic information of national scope on the economic aspects of hunting and sport fishing has been completed and data contained in the more than 9,000 questionnaires are now being an

alyzed, according to an April 20 announcement by the Director of the U.S. Fish and Wildlife Service.

The results of the survey will be submitted to the Fish and Wildlife Service this summer in time to permit preparation of a detailed report for presentation at the September meeting of the International Association of Game, Fish and Conservation Commissioners.

Printed copies of the Service report will be available at that time.

The survey under the direction of the Fish and Wildlife Service was made by the Crossley, S-D Surveys, Inc., of New York, successful bidder from among nine firms which submitted proposals for the task. Two hundred Crossley interviewers, working with a



Opening of trout season.

sample of 15,000 homes selected scientifically throughout the country with some located in each state, contacted hunters and fishermen in 5,200 homes. The questionnaire form was pretested in eight widely-separated sections of the country before finally being adopted.

The survey is being done largely as the result of a resolution adopted at the September 1954 meeting of the International Association of Game, Fish and Conservation Commissioners. Wildlife conservationists generally have felt the need for evaluation of the place of hunting and sport fishing in the national economy.

The survey directed by the Fish and Wildlife Service is national in scope. Eight States, each wanting more specific economic information about hunting and fishing within its own boundaries, contracted for special state surveys which were made at the same time as the national study.

Note: Also see Commercial Fisheries Review, February 1956, p. 31; July 1955, p. 39.



Tuna Fishery

MID-PACIFIC UPWELLING EFFECT ON TUNA FISHERY STUDIED BY SERV-ICE: A greater than usual upwelling of water in the mid-Pacific and its possible effect upon the tuna fishery of that area are being closely watched by the U.S. Fish and Wildlife Service, a May 8 news release reported.

The huge upwelling has occurred along the equator, south of Hawaii. The Service is studying the temperature and chemical content of the water, the speed and direction of the ocean currents, and the abundance of plankton in a 1,000-mile strip of ocean which spans the equator southeast of the Islands. Upwelling of water is a common occurrence along the equator, but because of the potentialities of this particular action Service scientists felt it warranted attention.

The upwelling is caused by displacement of surface water by the prevailing easterly winds. This sets up vertical currents which result in the transfer of fertile water from the cool depths to the surface of the sea.

Because of its fertility, the "new" water has the ability to produce and maintain an extraordinary abundance of plankton.

The Fish and Wildlife Service has made two special studies, one on the equator and the other at 1° N. latitude to discover the speed at which the sea water was flowing away from the area of the upwelling. In this work, drags were hung deep in the water from floats which were followed and checked for speed and direction.

The objective of the study is to find out where the drifting mass of fertile water, with its cargo of developing plant food, will be when it becomes a good tuna feeding ground.

Service officials believe that if this objective is achieved, predicting the location of a good tuna-fishing area will be possible.



U. S. Foreign Trade

EDIBLE FISHERY PRODUCTS, FEBRUARY 1956: United States imports of edible fresh, frozen, and processed fish and shellfish for February decreased about

15 percent in quantity and 9.6 percent in value as compared with January 1956, but were higher by 11 percent in quantity and 31.6 percent in value than for February 1955. The dollar value in February 1956 was close to 29 cents a pound, compared with 24.4 cents a pound in February 1955. Shrimp imports were about 2.7 million pounds higher in February 1956 when compared with February 1955 and this increase will account for most of the increase in value, according to a U.S. Department of Commerce summary (see table).

Exports of processed fish and shellfish in February 1956 decreased about

United States Foreign Trade in Edible Fishery Products, February 1956 with Comparisons										
		Quant	ity	Value						
Item		eb.	Year	F	Year					
	1956	1955	1955	1956						
	(Mill	ion of	Lbs.)	(Mi	lions	of \$)				
Imports: Fish&Shellfish: Fresh,frozen& processed1/	61.8	55.7	768,3	17.9	13.6	206.4				
Exports: Fish&Shellfish: processed1/ only (excluding fresh & frozen)		6.8								
1/ Includes pastes, sauces, clam chowder and juice, and other specialties.										

37.5 percent from the January 1956 total, but were about the same as for February 1955. The value of exports in February 1956 was also close to the February 1955 value, but was down 28.6 percent from January 1956.

GROUNDFISH FILLET IMPORTS UP IN APRIL: United States imports of groundfish (including ocean perch) fillets during April 1956 totaled 11.9 million pounds compared with nearly 11.0 million pounds imported during April of last year. This was a gain of 8 percent. The primary cause for the gain was a 3.5-million-



pound increase in imports of groundfish and ocean perchfillets from Iceland. Increases of lesser importance were also noted for Norway, the Netherlands, and Miquelon and St. Pierre. Imports of groundfish fillets from Canada, Denmark, the United Kingdom, and West Germany were somewhat lower during April of this year than during the same month of 1955. France, Greenland, and the Union of South Africa exported groundfish.

fillets to the United States during April 1956 but did not export any during the corresponding month of last year.

Canada continued to lead all other countries exporting groundfish and ocean perch fillets to the United States with 5.9 million pounds during April 1956--49 percent of the groundfish fillets imported during that month. Iceland was in second place with 4.5 million pounds.

Total groundfish and ocean perch fillet imports into the United States during the first four months of 1956 amounted to 50.1 million pounds. This was 6 percent more than the quantity imported during the corresponding period of last year. Canada, with 31.4 million pounds, led all other countries exporting fillets to the United States during that period, followed by Iceland (13.9 million pounds) and Norway (2.1 million pounds).

* * * * *

IMPORTS AND EXPORTS OF SELECTED FISHERY PRODUCTS, APRIL 1956: United States imports of frozen tuna during April and the first four months of 1956

were less than the same period a year ago, but canned tuna imports were larger. Frozen albacore imports during January-April this year were 27 percent less than a year earlier while imports of other frozen tuna gained 15 percent. Canned albacore imports were 16 percent greater and other canned tuna imports 5 percent over thosefor the comparable four-month period a year earlier. For the first four-months of 1956, 45.1 million pounds of frozen tuna



were imported as compared with more than 50 million pounds in the similar period of 1955; almost 10.7 million pounds of canned tuna were received as compared with 9.8 million pounds a year earlier.

Imports of groundfish fillets in April 1956 and for the first four months of 1956 were larger than during the corresponding periods of 1955. However, a substantial drop occurred in imports of fillet blocks and slabs, which was more than compensated by an increase in ordinary fillets. Imports of haddock, hake, pollock, and cusk fillets totaled 15.9 million pounds for the first four months of 1956, an increase of 54 percent over the same 1955 period; imports of cod fillets likewise gained 28 percent and totaled 15.4 million pounds. Imports of fillet blocks and slabs January-April 1956 were 40 percent less than for the same period in 1955.

Imports of shrimp in the first four months of 1956 were 80 percent larger than the previous year--22.8 million pounds as compared with 12.7 million pounds. A small increase was shown in imports of lobster which totaled nearly 14 million pounds for the first four months of 1956--a small increase over a year earlier.

Fish meal imports were greater for both April and the first four months this year than for the same period the previous year. Imports during April amounted to 12.7 million pounds; January-April 1956 imports totaled 40.1 million pounds, 9 percent above a year ago for that period.

Canned salmon imports totaled 3.3 million pounds in April and 9.7 million pounds for the first four months of 1956. This compared with slightly over 1 million pounds imported during January-April 1955.

United States exports of canned salmon January-April 1956 totaled only 0.5 million pounds as compared with 3.9 million in the same period of 1955. Exports of canned sardines totaled 19.4 million pounds--18 percent greater. Fish oils exported totaled 41.6 million pounds, about the same as in the comparable four months a year ago.

Veterans' Hospitals Consumption of Fish

An estimated total of 1, 378, 812 pounds of fresh and frozen fish and 710, 386 pounds of canned fish were purchased by the U. S. Veterans' Administration Hos-

Table 1 - Amount of	Fresh an	d Frozen F	sh Purch	sed by Vet	erans! Adı	ministration	Hognital	s October	1954-Sente	mher 1955
Table 1 Table 0	North			Central		uth		est		otal
		Avg. Cost		Avg. Cost		Avg. Cost		Avg. Cost		Avg. Cost
Species	Quantity	Per Lb.	Quantity	Per Lb.	Quantity	Per Lb.	Quantity	Per Lb.	Quantity	Per Lb.
	Lbs.	\$	Lbs.	\$	Lbs.	\$	Lbs.	\$	Lbs.	\$
GROUNDFISH:										
Ocean perch	69,544	.30	87,840	. 26	99,816	. 28	17,628	. 28	274, 028	. 28
Haddock	97,684 37,484	.30	54, 280	.26	58, 428	. 29	13,564	. 30	223, 956	. 29
Cod Other (pollock,	31,404	.28	37, 204	. 25	24, 460	.29	21,912	. 27	121,060	.27
hake, and cusk)	35,496	. 24	_		4,800	. 22		-	40, 296	. 24
Total Groundfish	240, 208	.29	179.324	.26	187, 504	.28	53, 104	. 28	660, 140	.28
	210,200	1.00	110,021	120	101,001		00,101	. 20	000,110	. 20
OTHER: Flounder	51,568	. 42	05 800	40	40.044	4.0			4 45 500	10
Halibut	28, 320	.42	25,760	.42	49,344	.42	18,924 39,608	.26	145,596	. 40
Salmon	25, 664	. 65	53,112	. 41	24,056 5,156	.33	39, 606	.30	145,096 84,496	. 34
Sea bass	868	.42	22,132	. *1	13,628	.39	32, 424	.33	46, 920	.35
Catfish	-		12,432	. 32	23,608	.40	4, 372	.32	40,412	.37
Mackerel	24, 348	.27	,	-	15,308	. 37	2,010	-	39,656	. 31
Whiting	17,724	.30	6,620	.27	10,020	.19	-	-	34, 364	, 26
Red snapper	-	-	-	-	18,844	.52	15,456	.29	34, 300	. 42
Pike	204	, 55	24, 268	.41	-	-	-	-	24, 472	. 42
Swordfish	11,092	.43	-	-	1,616	.59	10,280	.31	22,988	. 39
Corvina	-	-	-	-	-	-	18,440	.28	18, 440	. 28
Rockfish	-	-		-	720	.52	15, 200	. 29	15, 920	. 30
Trout	4,012	.34	1,420	.40	11,464	.30	0 004	. 34	12,884	. 31
Smelts Drumfish	4,012	. 34	392	.27	5,600	. 38	3,084	. 34	7,488 5,600	. 34
Bluefish	5,572	.38	1 -		3,000	. 50			5,572	. 38
Whitefish	516	.52	4,616	.49	168	.45			5, 300	.50
Scup	-		-,010		5,212	.17	1 -	_	5, 212	.17
Croaker	-	-	-	-	4,924	.35	-	-	4, 924	. 35
White bass	-	-	3,300	. 33	-	-	-	-	3, 300	. 33
Yellow perch .	-	-	2,904	.63	-		-	-	2,904	, 63
Tortuava	-	-	-	-	-	-	2,600	.34	2,600	. 34
Butterfish	2,412	.31	-	-		-	-	-	2,412	. 31
Herring		1	-	-	2,200	.12	-	-	2, 200	. 12
"Deep sea white"	1,516	.38	-	-		-	-	-	1,516	. 38
Mullet	-	-	1,244	-	1,308	. 31	-	-	1,308	. 31
Woldfish	-	1 -	1,244	. 36	_	-	904	. 38	1, 244	. 36
Ling cod							484	. 38	904 484	.38
Fresh-waterfish	160	.70					404	. 20	160	. 70
Total Other Fish	173,976	.41	158,800	. 38	193, 176	. 38	192,720	. 31	718,672	. 37
Total Fresh and	10,010		20,000		-00,270			. 01	110,012	
FrozenFish .	414, 184	.34	338, 124	. 31	380,680	.33	245, 324	.31	1,378,812	. 33

pitals during October 1954 through September 1955. (Shellfish purchases are not included.)

FRESH AND FROZEN FISH: In all, 35 species of fresh and frozen fish were purchased, with ocean perch and haddock fillets accounting for better than one-third (36 percent) of the total quantity bought. Six species of groundfish (cod, haddock, ocean perch, pollock, cusk, and hake), as a group, accounted for almost half (660,000 pounds) of the purchases.

Although the total pounds of fresh and frozen fish purchased accounted for 56 percent of all fishery products purchased by these hospitals, the estimated expenditure of \$448,561 for fresh and frozen fish represents only two-fifths (42 percent) of the total dollars expended by these hospitals for all fishery products during the

Table 2 - Annual Per Capita Consumption of Fresh and Frozen Fish in Veterans' Hospitals, Oct. 1954-Sept. 1955

	Average No. of Patients	Groundfish (Incl. Ocean Perch)	Other Fresh or Frozen Fish	Total
Northeast	28,686 29,340 34,040 15,681	9.00 6.11 5.51 3.39 6.24	6.52 5.41 5.67 12.29 6.80	15.52 11.52 11.18 15.68

survey period. The average cost per pound of fresh and frozen fish was \$0.33, ranging from a low of \$0.12 for fillets of lake herring to a high of \$0.70 per pound for assorted fresh-water fillets.

Regionally, Veterans' Administration Hospitals located in Northeast (see table 2) purchased the greatest total number of pounds of fresh and frozen fish while those in the West purchased the smallest quantity. Veterans' Administration Hospitals in the West, however, served more pounds of fish per patient than did hospitals in other regions. It is interesting to note, in this connection, that the average yearly consumption per patient in the Northeast and West were both significantly higher than the averages in either the North Central or South.

These findings are based on a mail inquiry of a sample of 105 Veterans' Administration Hospitals located throughout the United States. Included in this study were all Veterans' hospitals averaging a thousand or more patients, and a systematic

Table 3 - Canned Fish Issued to Veterans'

Administration Stations, Oct. 1	954-Sept. 1955
	Quantity
	.(1,000 Lbs.).
BY SPECIES:	
Salmon:	
Red	300.2
	102.8
Total Salmon	403.0
Tuna	227.0
Sardines	80.4
Grand Total	710.4
BY AREAS:	
East (Somerville, N. J.).	283.7
North Central (Hines, Ill.).	335.7
West (Wilmington, Calif.) .	91.0
Grand Total	710.4

random sample of hospitals with an average patient load of less than a thousand during the survey period.

CANNED FISH: Over 700,000 pounds of canned fish were issued to Veterans' Administration Stations from October 1954 through September 1955. More than half (57 percent) of the canned fish issued was canned salmon and almost threefourths of this was of the red variety.

Of the total pounds of canned fish issued, canned tuna accounted for approximately one-third and sardines for one-tenth.

The effect of seasons on canned fish issued is not too distinct. The quantity of salmon issued throughout the year was relatively stable, while sardines show a definite high point in the summer months (July-September). On the other hand, over half of the canned tuna was issued during the fall and winter months (October through March).



Washington

PROGRAM FOR REMOVAL OF SCRAP FISH, 1955/56: Otter trawlers in southern Puget Sound removed 1,094,870 pounds of scrap fish and sole infested with parasites during the four-month season ended March 31, the Washington State Department of Fisheries announced on April 23, 1956. This is part of a program by the State to remove predatory dogfish populations and eliminate parasitized sole in order to improve the catch of marketable fish.

The landings included 494,870 pounds of dogfish, ratfish, skate, octopus, and hake, and 600,000 pounds of English sole infested with parasites fit only for reduction to fish meal or for use as animal food.

The total food-fish catch of marketable sole, true cod, flounder, and other species totaled 182,600 pounds, evidence that the opening of the southern Puget Sound area and Hood Canal after long closure is increasing the proportion of marketable fish. The food-fish catch in 1954/55 was only 72,435 pounds.

During the first season (1953/54), the reopened areas produced a catch of 2,042,000 pounds of scrap fish and a food-fish catch of 248,000 pounds in southern Puget Sound waters. The 1955/56 special season on Hood Canal resulted in a scrap fish take of only 13,700 pounds as against 584,900 pounds in 1954/55.

The reduction in landings of scrap fish is regarded as significant progress toward restoration of the areas for food-fish production.

* * * * *

STATE FISH HATCHERIES TO PLANT RECORD NUMBER OF SALMON IN 1956: The 19 salmon hatcheries and rearing stations of the Washington State Department of Fisheries will release close to 33.5 million salmon fingerlings and yearlings in 1956, according to an announcement made on April 17.

More than 4 million of the baby salmon will be marked in various ways for experimental purposes.

The planting program is one of the largest involving reared fish in the Department's history. It will involve 24.2 million fingerlings and 9.3 million yearlings (including 23,440,000 fall chinook, 529,000 spring chinook, 8,676,000 silver, 520,000 pink, 250,000 chum, 46,000 sockeye, and 29,000 steelhead).

Puget Sound district hatcheries will be making the most plants, with a total of 17.3 million of all species. The Columbia River district is next, with a total 12.1 million. Willapa Harbor and Grays Harbor hatcheries will release 4.1 million.



Wholesale Prices, May 1956.

During May 1956 the over-all wholesale index for all edible fish and shellfish (fresh, frozen, and canned) increased 3 percent over that for April 1956 (111.7 percent as compared with 108.6 percent of the 1947-49 average). The index for May 1956 was also higher by 14 percent when compared with May 1955. Changes in the indexes during May 1956 were due primarily to higher prices for the drawn, dressed, or whole finfish subgroup.

Table 1 - Wholesale Average Prices and Indexes for Edible Fish and Shellfish, May 1956 with Comparisons									
Group, Subgroup, and Specification	Point of Pricing	Unit	Avg.	Prices1/		Index 1947-49			
			May 1956	Apr. 1956	May 1956	Apr. 1956	Mar. 1956	May 1955	
ALL FISH & SHELLFISH (Fresh, Frozen, & Canned).	!	• • • • • •	• • • •		111.7	108,6	113,1	98.1	
Fresh & Frozen Fishery Products:					120.6		120.6	97.9 85.6	
Drawn, Dressed, or Whole Finfish: Haddock, Ige., offshore, drawn, fresh Halibut, West., 20/80 lbs., drsd., fresh or froz. Salmon, king, Ige.& med., drsd., fresh or froz. Whitefish, L. Superior, drawn, fresh. Whitefish, L. Erie pound or gill net,rnd.,fresh Lake trout, domestic, No. 1, drawn, fresh Yellow pike, L. Michigan & Huron,rnd.,fresh	Boston New York ,, Chicago New York Chicago New York	lb	.07 .40 .63 .62 .74 .51	.34 .61 .69 .60 .54 .21	113,3 70,9 123,8 140,5 153,7 148,6 104,5 68,0	50.1 106.2 137.1 171.0 121.3 110.6 49.3	78.5 98.0 137.6 204.5 161.8 168.0 123.1	57.6 68.1 111.8 141.3 146.6 96.3 93.8	
Processed, Fresh (Fish & Shellfish): Fillets, haddock, sml., skins on, 20-lb, tins Shrimp, Ige. (26-30 count), headless, fresh or froz. Oysters, shucked, standards	Boston	lb, gal.	.27 .79 5,50	.24 .79	91.9 124.8 136.1	126.6 81.7 124.8 139.2	126.5 102.1 120.9 139.2	108.5 85.1 108.6 114.4	
Processed, Frozen (Fish & Shellfish):					115.2	114,3	112,3	95.6	
Fillets: Flounder, skinless, 1-lb, pkg. Haddock, sml, skins on, 1-lb, pkg. Ocean perch, skins on, 1-lb, pkg. Shrimp, lge. (26-30 count), 5-lb, pkg.	Boston ,,, Chicago	115.	.40 .29 .29 .76	.29 .29	103.4 91.0 114.8 118.1	91.0	102.1 91.0 114.8 113.0	99,5 80,0 106,7 91,0	
					99.0	99.2	102,4	98,3	
Salmon, pink, No,1 tall (16 oz.), 48 can/cs. Tuna, it.meat, chunk, No, 1/2 tuna (6-1/2 oz.), 48 can/cs. Sacrines, Calif., tom. pack, No, 1 oval (15 oz.), 48 cans/cs.	Los Angeles	case	21,27 10,60 7,50	10.70	76.4 87.5	120.0 77.1 86.1	120.0 85.1 83.2	90.1 88.1	
Sardines, Maine, keyless oil, No. 1/4 drawn (3-1/4 oz.), 100 cans/cs	New York	,,	8.45	8,45	89.9	89.9	89.9	71,3	

L/Represent average prices for one day (Monday or Tuesday) during the week in which the 15th of the month occurs, These prices are published as indicators of movement and not necessarily absolute level. Daily Market News Service "Fishery Products Reports" should be referred to for actual prices,

The May 1956 index for the drawn, dressed, or whole finfish subgroup increased 12.7 percent from April 1956 and was higher by 32.4 percent as compared with May 1955. Prices for haddock at Boston increased from the seasonally low April 1956 level and frozen halibut prices continued to move upward due to light supplies. The May 1956 indexes for haddock and halibut were higher by 23.1 and 81.8 percent, respectively, as compared with May 1955. All other items in this subgroup for May 1956 were higher when compared with May 1955 except for yellow pike, which was lower by 27.5 percent.

The fresh processed fish and shellfish subgroup index in May 1956 was down slightly as compared with April 1956, however it rose 16.2 percent when compared with May 1955. Higher ex-vessel costs for fresh drawn haddock were

reflected in the increase in fresh haddock fillets (up 12.5 percent). Fresh shrimp prices were steady from May to April 1956 but the index value for May 1956 was up

about 19 percent compared with the same month a year ago.

The May 1956 index for the frozen processed fish and shell-fish subgroup was higher by less than 1 percent as compared with April 1956, but increased sharply by 20.5 percent when compared with May 1955. The May 1956 index for the frozen fillets that make up this subgroup increased close to 8 percent and frozen shrimp was higher by 30 percent when compared with May 1955.

The canned fishery products subgroup index for May 1956 was about unchanged from April 1956 and less than 1 percent above the



Display case for fishery products.

index for May 1955. Increases in 1956 prices of canned pink salmon and Maine sardines were offset by a 15.2 percent decrease in canned light meat tuna from May 1955 to May 1956.



UNUSUAL METHOD FOR CATCHING MULLET

An unusual and interesting but efficient method for catching mullet is used in Malta.

A large raftlike structure, composed of canes bound together, is built to conform to the width of the place where it is to be used, usually the mouth of a creek. This is anchored across the entrance of the creek by its four corners, and a vertical wall of netting is hung from the side heading towards the creek. Several men in boats pass up the creek beyond the raft; then fishing begins. The men come downstream towards the raft, beating the water, splashing frantically, and in general making as much noise as possible, driving the mullet before them. This species, one of the best jumpers among fish, cannot pass the wall of webbing, but many attempt to leap over the obstruction. Their leap sends them onto the raft which has much loose straw and branches of trees to prevent further leaps of the fish. The fish are then gathered up and carried off to market, where they are much esteemed.

--<u>Sea Secrets</u>, The Marine Laboratory, University of Miami, Coral Gables, Fla.



International

NORTHWEST ATLANTIC FISHERIES COMMISSION

FISHERIES TRENDS IN NORTHWEST ATLANTIC CONVENTION AREA: Canada: The 1955 cod landings of Canada from the Northwest Atlantic area were smaller than those of 1954, but higher than in 1953. The decline was most pronounced for the Newfoundland area, amounting to almost 25 percent, and a corresponding decline



in the production of salt cod occurred. Haddock landings both from Subarea 3 and 4 continued to increase. The increase of the haddock landings continued in January and February 1956 and in these two months were twice as high as in the same months in 1955.

The regulations of mesh sizes in nets used by trawlers and draggers, recommended by ICNAF were announced as going into effect for the Canadian trawlers and draggers on January 1, 1957, reports the Commission's Newsletter of May 15.

New excellent cod fishing grounds have been discovered off the east coast of Newfoundland as the result of long-lining experiments carried out for the Re-

search Board of Canada by the Biological Station in St. John's. The grounds extend from the northern edge of the Grand Bank to beyond the Strait of Belle Isle, spreading over an area of 10-60 miles offshore.

<u>France</u>: The French frigate <u>l'Aventure</u> will carry out its usual campaign in the Northwest Atlantic area from March to October, i. e. during the main fishing season for the French trawler fleet. Although the main purpose is to assist the fishermen, hydrographical and meteorological observations will be made. <u>l'Aventure</u> will visit Subareas 1, 2, 3, and 4.

<u>United States</u>: The U. S. A. explorations for new fishing areas for ocean perch were continued in December, to the east of the Laurentian Channel. The largest single ocean perch catch (2,000 pounds) was made south of St. Pierre Bank at a depth of 225 fathoms. The research was impeded by bad weather conditions.

Norway: The modern Norwegian fishing vessel Senior landed in December 1955 in England 70 tons of line-caught halibut from West Greenland waters. This landing is additional evidence of the renewed Norwegian interest in the fishery for halibut in Subarea 1, and furnishes a further incitement to the international research work on West Greenland halibut planned by the ICNAF Panel 1.

1956 Campaign of the European Cod Fishing Fleets: In the middle of January the first Spanish trawlers (PYSBE) left for the Newfoundland area, towards the end of the month they were followed by others (COPIBA). It is expected that the number of trawlers will be a little larger than last year; the number of vessels will in the near future be increased by several new units; the building of further units is

planned. The Spanish fishing fleet is in a few years hence supposed to be able to saturate the Spanish market with salt cod.

In the first half of February Spanish pair trawlers left for Subarea 3.

Around the middle of February a number of French trawlers left Fecamp for the Grand Banks of Newfoundland.

February 15 and 17 the two large Italian trawlers <u>Genepesca I</u> and <u>Genepesca II</u> sailed from Livorno for their first trip of 1956 to the Grand Banks and the West Greenland Banks.

During February most of the Portuguese trawlers left for the Convention Area. About 22 trawlers, nearly the same number as last year, will fish in the Northwest Atlantic in the 1956 campaign.

In the beginning of March the Portuguese dory vessels left their home ports on their way to the Convention Area. Some 50 dory vessels will be fishing cod in that area this year, among them several newly-constructed units.

Up to April about 20 Norwegian vessels had left for the West Greenland fishing banks.

The Greenland Department of the Danish Government has had a new research-fishery vessel (Sujumit) of the cutter-type constructed for experimental fishing in Greenland waters. The main work of this vessel will be the trying of new fishing methods, the exploration of fishing banks, and the locating of fish shoals. During 1956 it will start work in Greenland waters. Together with another cutter of the Greenland Department it will carry out experimental fishing with pair-trawl.

The first results of the Spanish fishery on the Grand Bank this year have been highly satisfactory, especially the pair-trawlers which have reported exceedingly good yields. Some of them are reported to have left the Banks with full loads either for Vigo (Spain) or for St. Pierre et Miquelon.

UNITED NATIONS TECHNICAL ASSISTANCE BOARD

PROPOSALS FOR FUTURE EXPANDED PROGRAM OF TECHNICAL ASSISTANCE: The United Nations Technical Assistance Board released on May 18 a report outlining proposals for possible future development of the Expanded Program of Technical Assistance based on a review of the experience gained in the first six years of that Program's operation.

Summarizing activities under the Program since 1950, the report ("The Expanded Program of Technical Assistance: A Forward Look," Doc. E/2885) points out that 78 countries have pledged a total of US\$142 million for the financing of the Program; that some 131 countries and territories have been helped at one time or another; and that 77 countries have supplied experts to the Program while 105 countries and territories have provided training facilities.

"It may safely be said," observes the report, "that never before have the resources of so many countries been mobilized for a world-wide, cooperative enterprise."

Turning to the future, the report suggests that two possible levels of expansion might be considered; the first "involving a modest increase in resources to finance limited expansion of activities within the present scope of the Program;" the second, "looking forward to a much more far-reaching extension of the work."

It suggests that to achieve the "limited advance" embodied in the first possibility, a target figure of US\$50 million for the annual income of the Program might be set, to be approached in stages over the next few years. The report stresses, however, that this would do no more than enable the participating organizations "to maintain the momentum of present activities within the existing scope of the Program and to meet the more urgent requests of newcomers."

For the more substantial expansion envisaged in the second possibility foreseen by the Board, the report states "it would be too theoretical an exercise to make any estimate of the sum needed ... in the absence of guidance from the Technical Assistance Committee concerning the realistic limits which should govern the calculation." It indicates, however, that it would call for resources "many times the size of those now available."

Among the specific suggestions included under "Agricultural Research and Demonstration Projects" is:

"(v) fisheries could be made much more effective if full operational projects were developed, combining the initial survey with the provision of mechanized fishing boats and of cold-storage plants for effective distribution of increased supplies."

JAPAN-U.S.S.R. REACH AGREEMENT ON PACIFIC SALMON FISHING

Japanese fishermen can begin fishing for salmon in the Northwest Pacific immediately, according to an interim agreement in the form of an exchange of notes reached on May 15 between Soviet Russia and Japan covering the 1956 salmon fishing season. According to reports from Moscow, a Japanese spokesman indicated that since the exchange of notes is as binding as a treaty it permits Japanese fishermen to enter restricted zones off the Soviet Asian coast and fish for salmon. The agreement was the result of negotiations between the Soviets and a Japanese mission which left Japan on April 13, 1956.

An official Soviet Russian radio announcement on March 21 from Moscow stated that salm on fishing in the area of the entire Okhotsk Sea, the western portion of the Bering Sea, and the Northwest Pacific would be restricted between May 15 and September 15, 1956. The March 21 regulations also restricted the salmon catch to 50,000 tons or about 25 million fish. However, the exchange of notes raises the annual salmon catch for Japanese fishermen to 65,000 tons, according to a Japanese spokesman.

In addition to the interim salmon-fishing agreement, the Russian and Japanese ministers at the same time signed a 10-year fisheries treaty and a 3-year searescue agreement. Both of these agreements will go into effect when the Russo-Japanese peace treaty is negotiated.

A release for the U.S. Information Service, Tokyo, states;

"1. Official note concerning regulatory measures for fishing operations in the territorial area of each nation:

"This indicates an understanding reached between both governments that they should take necessary measures for conservation of fish resources in their respective countries, parallel with their joint steps on the high seas.

"2. Official note on an understanding that the provisions of Article 2 of the sea-rescue agreement will not affect the stand of the signatory nations on the scope of territorial waters.

"3. Official note pertaining to provisional measures on the salmon fishing for this year:

"This shows an understanding that Japanese fishermen will be allowed to catch 65,000 tons of salmon during this year's fishing season in the restricted area declared by the Soviet Council of Ministers.

"In addition a letter \dots was attached, saying that approval by the Japanese Diet is required."

JAPAN-U.S.S.R FISHERIES TREATY

On May 15, 1956, a long-range agreement was reached between Japan and the Union of Soviet Socialist Republics regarding the fisheries on the high seas in the North Pacific Ocean. This long-range treaty will enter into force on the effective date of a peace treaty between Japan and the U. S. S. R. or on the date of resumption of diplomatic relations.

Fishing in the North Pacific area during the 1956 season is governed by another agreement reached specifically for the 1956 season (see preceding article).

The text of the long-range treaty follows:

TREATY--BETWEEN JAPAN AND THE UNION OF SOVIET SOCIALIST REPUBLICS CONCERNING FISHERIES ON THE HIGH SEAS IN THE NORTH PACIFIC OCEAN

The Government of Japan and the Government of the Union of Soviet Socialist Republics, having a common interest in the development of fisheries on a rational basis in the Northwestern Pacific, and taking into consideration their mutual responsibilities regarding conditions of the fish species and other marine animal resources and their effective utilization:

In recognition of their agreement that the maintenance of the maximum sustained productivity of fisheries in the Northwestern Pacific is of common benefit to mankind and the two Signatory Powers;

Considering that each Signatory should assume, the duty on a free and equal basis to plan for the preservation and increase of the above described resources;

The two Signatories, recognizing that it is highly desirable to promote and coordinate scientific research for the purpose of maintaining maximum sustained productivity in the fisheries with which the two Signatories are concerned;

Have, therefore, decided to conclude this Treaty and have respectively appointed Representatives for this purpose. These Representatives have agreed as follows:

Article I

- 1. The area to which this Treaty applies (hereinafter called "Treaty Area") shall be the entire waters (excluding territorial waters) of the Northwestern Pacific Ocean, including the Japan Sea, the Sea of Okhotsk, and the Bering Sea.
- 2. It shall be understood that no provisions of this Treaty shall affect in any way whatsoever

the position of the Signatories as regards the extent of the territorial waters and their jurisdiction over fisheries [therein?].

Article II

- 1. Both Signatories agree, for the preservation and development of fish and other marine anmal resources (hereinafter to be called "fishery resources"), to adopt for the Treaty Area the joint measures indicated in the Appendix 1/to this Treaty.
- 2. The Appendix $\frac{1}{2}$ to this Treaty shall be considered as constituting an inseparable part of the Treaty. The word "Treaty" shall be understood to include this Appendix $\frac{1}{2}$ in its present wording or as amended in accordance with Paragraph (a) of Article IV.

Article III

- In order to fulfill the objectives of this Treaty, both Signatories shall establish a Japanese-Soviet Fisheries Commission (hereinafter called "Commission").
- The Commission shall be comprised of two National Committee Divisions; each National Committee Division shall consist of three Commissioners appointed by the Governments of the respective Signatories.
- 3. All resolutions, recommendations, and other decisions of the Commission shall be made only upon agreement between the National Committee Divisions.
- 4. The Commission shall determine the rules for the conduct of meetings and may revise them whenever necessary.

1/Not available at present.

- 5. The Commission shall meet at least once annually and in addition may meet at the request of the Nationality Committee Division of either party. The date and place of the first meeting shall be determined by agreement between the two Signatories.
- 6. The Commission shall at its first meeting select a Chairman and a Vice Chairman from the two different National Committee Divisions. The Chairman and the Vice Chairman shall be selected for a term of one year. The selection of the Chairman and the Vice Chairman from the National Committee Divisions shall be accomplished in such a way that each year each Signatory shall be represented in these positions on a rotation basis.
- The official languages of the Commission shall be Japanese and Russian.
- 8. The expenses incurred by the Commissioners in attending Commission meetings shall be defrayed by the appointing government. The Commission shall pay the joint expenses of the Commission in accordance with the allotted charges to be borne by the two Signatories as advised by the Commission after the formality of approval and allocation by the two Signatories.

Article IV

The Commission shall carry out the following duties:

- (a) At the meeting following regular annual meetings, joint measures which are being enforced at the time shall be examined for their appropriateness and, if necessary, the Appendix to this Treaty may be amended. These amendments shall be determined on a scientific basis.
- (b) If, in accordance with the Appendix, a fish species requires determination of the total annual catch, the Commission shall determine the amount of annual catch for the said fish species for both Signatories and report the figure to the two Signatory Powers.
- (c) In implementing this Treaty, the Commission shall determine the kind and scope of statistics and other data which each Signatory shall submit to the Commission.
- (d) The Commission shall draw up and coordinate joint scientific research programs for the purpose of studying fishery resources and shall recommend these to the two Signatories.
- (e) It shall submit annually to both Signatories a report of the activities of the Commission.
- (f) Besides the duties indicated in the previous sections, the Commission may make recommendations to the two Signatories on problems dealing with the preservation and increase of fishery resources within the Treaty Area.

Article V

In order mutually to exchange experiences concerning fishery regulation and the study and preservation of fishery resources, both Signatories agree to carry out an exchange of men of science with experience in fisheries. These exchanges of persons shall be carried out upon agreement by the two parties for each such occasion.

Article VI

- 1. The two Signatories shall take appropriate and effective measures to carry out this Treaty
- 2. When a Signatory receives notification from the Commission relative to the amount of the total annual catch as determined for the Signatory in accordance with Paragraph (b) of Article IV, it shall issue licenses or certificates to fishing vessels on this basis, and the two Signatories shall notify each other concerning the issuance of all such licenses and certificates.
- 3. The licenses and certificates to be issued by the two Signatories shall be written in both Japanese and Russian and shall always be carried aboard when the fishing vessel is in operation.
- 4. In order to make the provisions of this Treaty effective, the two signatories shall enact and enforce the necessary laws and regulations, with appropriate punishment for violations committed by their citizens, organizations, and fishing vessels; moreover, both agree to submit to the Commission a report on the measures taken by their own country concerning this matter.

Article VII

- 1. When an authorized official of either of the Signatory Parties has sufficient reason to believe that a fishing vessel of the other Signatory is actually in violation of the provisions of this Treaty, the said official may board and search the said fishing vessel in order to determine whether or not the fishing vessel is observing the provisions of this Treaty. If the ship's captain demands it, the aforesaid official must present his identification papers issued by the Signatory Government to which he belongs, which shall be written in Japanese and Russian.
- 2. The said official may seize the said fishing vessel or arrest an individual if he discovers facts proving violations of the provisions of this Treaty by the fishing vessel or by an individual on board, as a result of his search of the said fishing vessel.

In such case, the Signatory Power to which the said official belongs shall as soon as possible inform the other Signatory Power to which the aforesaid fishing vessel or individual belongs, of the seizure or arrest; if the two Signatories cannot agree upon a different location, the said fishing vessel or individual must be turned over as quickly as possible at the same location to an authorized official of the Signatory Power to which they belong. If, however, the said Signatory Power

which received the report is not able immediately to receive them, and if the other Signatory Power is requested, the Signatory Power which receives such request may place the said fishing vessel or individual under surveillance within its own territory, if this is mutually agreed to by the two Signatories.

3. Only the authorities of the Signatory Power to which the said fishing vessel or individual belongs may try cases arising in connection with this Treaty; furthermore, they shall have the authority to mete out punishment for these [violations]. Records and evidence proving violation shall as soon as possible be presented to the Signatory Power having the jurisdictional right to try the case

Article VIII

1. This Treaty shall come into force on the effective date of a Peace Treaty between Japan and the Union of Soviet Socialist Republics or on the date of resumption of diplomatic relations.

Either of the Signatories may inform the other Signatory of its intention to abrogate this Treaty at any time after a period of ten years following the date on which this Treaty comes into force.

If such notification is given, this Treaty shall terminate one year after the date on which the abrogation notification was received by the other Signatory Power.

IN WITNESS WHEREOF, the undersigned Representatives have signed the present Treaty.

DONE at Moscow, in duplicate, in the Japanese and Russian languages, each text having equal authenticity, this [fifteenth] day of May, 1956.

For the Government of Japan:

For the Government of the Union of Soviet Socialist Republics:

FISH-PROCESSING TECHNOLOGISTS MEET AT ROTTERDAM

An international meeting of Fish Processing Technologists, sponsored by the Food and Agricultural Organization (FAO) Interim Committee on Fish Handling and Processing, was held at Rotterdam, Netherlands, June 25-29, 1956. The meetings were attended by technologists from member governments of F.A.O. and from non-member countries who wished to attend.

The chairman of the meeting was Dr. G. A. Reay of the United Kingdom and working committees were headed by F. Bramsnaes of Denmark, K. Bakken of Norway, Professor George Borgstrom of Sweden, and E. Heen of Norway who presented their reports on chilling and freezing of fish, fisheries products for tropical consumption, and prepackaged fisheries products.

A symposium was held during the meeting on the use of antibiotics, bacteriostatic ices and dips, brine-cooling, sea-water ice, scale and crushed ice, and freshfish quality assessment using organoleptic and objective methods.



Australia

PROSPECTS FOR TUNA FISHING INDUSTRY GOOD: The 84-foot former purse-seiner Tacoma obtained 30 metric tons of tuna on her first two trips as a tuna bait boat out of Port Lincoln, South Australia.

As reported in the <u>Adelaide Advertiser</u>, 10 tons were taken on the second 8-day trip which struck bad weather.

On the way back to port the $\underline{\text{Tacoma}}$ ran into two eagerly-biting schools of tuna near Cape Wiles and hauled over 400 fish aboard in four hours. At the peak of the strike, the 40-pound fish were taking the hooks at the rate of one every 10 seconds. Nearly a ton of them was hauled aboard in 10 minutes.

It was the second trip on <u>Tacoma</u> by two Californian fishermen who came out for trial fishing by arrangement with the South Australian Government. The paper reports them as saying:

"If your fishermen can regularly find schools of tuna like the best ones we have worked on the past three weeks, the prospects of establishing a worthwhile industry here are very good.

"To make it a stable proposition, however, you would probably need a fleet of at least a dozen boats with a crew of six or seven, and each capable of holding up to 40 tons of tuna. These boats would have to average about two tons of fish a day in your December-July season. They could go to other states when the local season ends."

The Port Lincoln cannery is paying 6d. (5.6 U.S. cents) a pound for the raw tuna, the <u>Fisheries Newsletter</u> (April 1956) of the Australian Commonwealth Director of <u>Fisheries reports</u>.



Brazil

NEW MARINE LABORATORY ESTABLISHED: A new marine biological laboratory, the Laboratorio de Biologia Marinha de Sao Sebastiao, was inaugurated in September 1955 at Segredo Beach, nearly 4 miles south of Sao Sebastiao, State of Sao Paulo, Brazil. It is operated by a foundation (Fundacao de Biologia Marinha), of which the University of Sao Paulo and its Departamento de Fisiologia Geral e Animal are founding members. It was built partially from grants made available by the University of Sao Paulo, the National Research Council of Brazil, and the Rockefeller Foundation.

The laboratory is intended to be a place where Brazilians and foreigners who are interested in marine biology can find adequate means of research. Training courses for graduate students in biological sciences will be a part of future laboratory activities.



Cambodia

CANNED FISH IMPORTS PROHIBITED: The importation of certain food products into Cambodia is now prohibited by a decree of the Minister of Finance and Economic Affairs dated April 26 and published May 9. Included among the prohibited products are canned fish and meats, and similar products such as birds' nests and abalone and sharks' fins, reports a May 10 dispatch from the United States Embassy at Phnom Penh.

Canada

BRITISH COLUMBIA REPORTS RECORD HERRING CATCH FOR 1955/56 SEASON: The greatest herring season in British Columbia's history ended with a total catch of 253,396 metric tons. From mid-November until fishing closed on March 8, a fleet of 90 seiners and many auxiliary vessels scouted and fished in coastal waters from Prince Rupert to the southern boundary, the April 1956 Trade News of the Canadian Department of Fisheries points out.

Top producing area was the Queen Charlotte Islands, where afleet of 60 seiners and numerous packing vessels endured several weeks of rough seas and freezing temperatures to harvest a catch of 92,637 tons in waters not restricted by catch quotas. The bulk of this was taken in the vicinity of Huxley Island, near the southern tip of the Queen Charlottes, where only minor quantities previously had been caught. Fish were first located here on February 6 and steady supplies continued to arrive on the grounds from adjacent Hecate Straits until fishing stopped and catches were limited only by the packing capacity of the fleet. Subsequent surveys indicate that large schools continued in evidence at this point after the season closed. The catch consisted preponderantly of large mature fish of good quality. The total Queen Charlotte Islands catch was more than three times the quantity of any previous catch from this area and was substantially greater than the yield of any other British Columbia herring fishing area at any time.

A total of 50,084 tons was taken from the Central Area of northern mainland coastal waters. The original 40,000-ton quota in this area was extended by 10,000 tons following the appearance of a volume of large size herring just before the fishermen's Christmas recess.

In the Northern Area, the catch was 11,000 tons out of a quota of 30,000 tons. A lower take than usual was not unexpected this season, and fishing effort was also less than normal due to the heavy fishery in other areas.

Earlier in the season herring fishermen, making a delayed start, quickly harvested the original 40,000 tons quota from large supplies available in the lower east coast of Vancouver Island Area, and the quota was extended by 10,000 tons. The total take from this area amounted to 48,978 tons.

Due to the large volume of herring present in the Middle East Coast Area, two extensions of 10,000 tons each were granted over the original 10,000-ton quota and the full 30,000 tons were taken from the plentiful supplies present.

The total catch from the west coast of Vancouver Island was just short of 20,000 tons; the bulk of this was taken in Barkley Sound.

According to the seasonal bulletin issued by the Department of Fisheries, the big catch resulted in a total yield of 47,000 tons of herring meal and 4.4 million gallons of herring oil, besides other herring products.

* * * * *

PLANT STANDARDS AND INSPECTION PROGRAM INAUGURATED: Uniform minimum standards for plants producing fish and shellfish products have been set by the Department of Fisheries of Canada and a voluntary program of plant inspection is being instituted in Nova Scotia, New Brunswick, and Prince Edward Island, effective May 1, points out the April 1956 Trade News of that Department.

The minimum standards for plant construction, equipment, and sanitation were reviewed by members of the Maritime fishing industry during meetings with Departmental officials in Halifax, N. S., and Moncton, N. B., in March. Agreement was reached during these meetings to enable the introduction of the minimum standards on a voluntary basis.

The minimum standards were drawn up by the technical branch of the Department's Inspection and Consumer Service following intensive research and investigation. In 1954, in cooperation with the fishing industry, the Department completed a coast-to-coast survey of more than 500 fresh, frozen, salt, and pickled fish plants which handled fish for interprovincial and international trade. The data collected during this survey was used as a basis in establishing the minimum plant standards.

A Federal-provincial meeting was held in Ottawa shortly following the survey, and the views of the ten provinces were expressed. General agreement was reached at that time on cooperative measures to bring about more effective inspection not only of fish products, but also of fish plants and procedures.

The setting of the minimum standards of construction, equipment, and sanitation of fish and shellfish plants is a further step in the advancement of the Department's over-all inspection program which is designed to maintain peak quality from the time the fish are caught until they reach the consumer.

* * * * *

INTERNATIONAL PINK SALMON MANAGEMENT REQUESTED: At its annual meeting in Ottawa April 9-11, 1956, the Fisheries Council of Canada (National Organization of Fish Producers and Wholesalers) adopted a resolution asking the Canadian Government to discuss with the United States the problem of the pink salmon



fishery of the Straits of Juan de Fuca, Puget Sound, and the Fraser River with the view in mind of "bringing under joint international management ... the valuable fishery of the area concerned."

In his speech before the annual meeting of the Fisheries Council, Canadian Minister of Fisheries James Sinclair predicted that an international agreement with

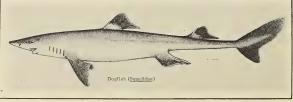
the United States concerning the pink salmon runs of the Fraser River would be negotiated in the near future. He noted that Canada's west coast fishermen have been trying to get an agreement on pink salmon similar to the International Pacific Sockeye Salmon Convention which has been so successful in rebuilding the sockeye runs of the Fraser, a May 15 dispatch from the United States Embassy at Ottawa points out.

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<u>DOGFISH</u> <u>BOUNTY</u> <u>ESTABLISHED</u>: The establishment by the Canadian Federal Department of Fisheries of bounty payments on dogfish caught by British Columbia fishermen, recently announced, will benefit both Canadian and United States fishery interests. The bounty is a direct conservation measure and its purpose is to

protect a valuable food fish by the removal of a predator, the April 1956 Canadian <u>Trade</u> <u>News</u> reports.

The Department offers to pay fishermen C\$10 a ton for whole dogfish, up to 30,000 tons in the current fis-



cal year, delivered to any British Columbia reduction plant which is willing to convert the dogfish to fish meal. Requests for the bounty were made by the fishing industry, the fishermen's unions, and the sport fishing clubs of British Columbia. It will be of immediate benefit to the British Columbia and United States fishermen who share in the catches of food fish built up by joint conservation under the conventions between Canada and the United States for the Fraser River sockeye salmon and the Pacific halibut fisheries.

The dogfish, a small member of the shark family, has no value in Canada as a food fish, but during the last war it was fished extensively for its liver, which yields a high-potency vitamin oil. The development of cheaper synthetic vitamins since the war largely ended this industry. As a consequence the number of dogfish in coastal waters has increased enormously. They devour large quantities of valuable fish, do great damage to fishermen's gear, particularly salmon nets, and nullify the work done by the Department of Fisheries in conserving and rehabilitating the West Coast fisheries.

Dogfish can be reduced into fish meal for use in livestock and poultry feeds, but this has not been economical because of cost. It is hoped that the experience which will be gained by the reduction plants on bounty-caught fish will enable them to make dogfish reduction an economical operation in the future. With the cooperation of the fishing industry and the fishermen, it is expected that the program will markedly reduce the number of these predators.

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WHALING IN BRITISH COLUMBIA: Whaling operations off the west coast of Vancouver Island, B. C., during the 1955 season produced 630 whales from the six killer ships operated by the one company engaged in this industry. The catch was equally as good as that of the previous season when the same number was taken, which marked the largest catch for a great many years. In 1953 the total catch was 539 whales, the Trade News of April 1956 reports.

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SALT SUBSIDY FOR ATLANTIC COAST SALT-FISH PRODUCERS: The Canadian Federal Government proposes to extend into 1956 the salt-assistance program which was available to Atlantic Coast producers of salted fish in 1955, the Minister of Fisheries announced recently. Under the plan the Government rebates to fishermen and plants producing salted-fish products 50 percent of the cost of their salt, provided the products are not marketed in the United States. Exclusion of the benefit with regard to products marketed in the United States is to avoid any suggestion of subsidization of exports to that market, the Minister said.

Again the assistance will be paid only on salt used to produce salted fish for sale. Salt used for preserving fish for bait will not be included.

Payments will be made to fishermen and plants operating in Newfoundland, Nova Scotia, New Brunswick, Prince Edward Island, and Quebec. Under the 1955 program between C\$400,000 and C\$500,000 has been or will be distributed to these producers.

The Minister made it clear that the program is being continued only on a year to year basis, the April 1956 $\underline{\text{Trade}}$ $\underline{\text{News}}$ announced.

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BRITISH COLUMBIA'S FISHERMEN'S SHORT UNIVERSITY COURSE: For the second year in succession a short course for fishermen has been held at the University of British Columbia in Vancouver. A class of 35 professional fishermen, selected from localities along the coast, began the course March 12 and finished March 23.

Fishermen were drawn from seining, gill-netting, trolling, and trawling branches of the fishery.

In the brief but intensive course a wide range of subjects relating to practical fishing was covered. Fishermen were given an opportunity to look briefly into the fields on fisheries biology, technology, and oceanography. Electronics, marine insurance, and the work of credit unions shared time with navigation and the care of engines. The work of international fishery commissions, fisheries economics, first aid, and boat designs were other subjects on the syllabus, states the April 1956 Trade News of the Canadian Department of Fisheries.

Instructors were recruited from the University faculty, the Fisheries Research Board of Canada, the Federal Department of Fisheries, international fishery commissions, and business and industrial organizations.

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ANTIBIOTICS TESTED ON WHALE CARCASSES: Attempts are being made by the Fisheries Research Board of Canada's Pacific Fisheries Experimental Station in Vancouver to find means of retarding the marked bacterial spoilage which occurs readily in whales between time of harpooning and processing into meal, oil, and other products. In view of the success which has attended experimental use of chlortetracycline in fish preservation, tests are being made with this antibiotic as applied to whale carcasses.

In an initial trial conducted at the Coal Harbour, B. C., whaling station about two ounces of the antibiotic in 10 gallons of solution were injected into the peritoneal cavity of a sperm whale by entraining it in the compressed air used to inflate the animal. In about two days the carcass of the treated whale was still in fairly good condition, while the visceral cavity and meat of an untreated animal of similar post-mortem age were markedly spoiled. Further tests are anticipated, according to the February 1956 Trade News of the Canadian Department of Fisheries.



TRAWLER FISHING NOT TO BE EXPANDED: A decision against further development of trawler fishing has been announced by the Minister of Industries and Fisheries, according to the Ceylon Daily News of May 11. The Fisheries Department is operating two trawlers given by Canada and manned by Canadian officers under Colombo Plan capital aid and technical assistance.

Canada has also given considerable financing under the Colombo Plan to the development of a fishing section in Colombo Harbor. It is reported that the coldstorage plant, which is the most important installation in the harbor, will rent at low rates its surplus storage space (now that no more trawlers are to be manned) to all sections of the fish trade and, possibly, to the meat and vegetable trade, a May 17 dispatch from the United States Embassy at Colombo points out.



El Salvador

STATUS OF FISHERIES EXPANSION PLANS: The appointment of Dr. Mario Hector Salazar as the new Minister of Economy foretells increased activity on the part of the Salvadoran Government toward the development of the fishing industry. For the past four years, as Minister of Labor, Dr. Salazar has worked hard in the development of a fishing cooperative and now with authority over all marine fisheries it is expected he will encourage the advancement of the industry. The new

Minister not only has a keen interest in fishing, but indicates that a concrete program for its development would be initiated as soon as possible.

In general, El Salvador has no distribution and marketing facilities, and all phases of fish care and handling need tremendous improvement, reports the United States Operations Mission in an April 13 report.

Nine applications for permission to fish have been received by the government and five provisional fishing permits have been issued. It is estimated that the boats now fishing bring in approximately 200,000 pounds of fish a month and some 20,000 pounds of shrimp. This represents an annual production of 2.4 million pounds of fish and 240,000 pounds of shrimp. The total catch of fish by all methods is roughly estimated at 3.3 million pounds a year, a considerable increase over the old catch of approximately 1.0 million pounds.



France

FIRST DIESEL-ELECTRIC POWERED FISHING TRAWLER: While Great Britain has produced in the Sir William Hardy the first experimental and research fishing trawler powered by Diesel-electric equipment, the French will have in operation shortly the first practical workaday trawler so powered, reports The Fishing News (April 27, 1956), a British fishery periodical.

The French vessel, the $\underline{\text{Cap}}$ $\underline{\text{Fagnet III}}$, now under construction at Ateliers et Chantiers de la Seine Maritime, has an over-all length of 245 feet, a moulded breadth of 37 feet 9 inches, a depth of 19 feet 8 inches, and a maximum draught aft of 19 feet 4 inches. The vessel will operate on the Grande Sole off Newfoundland and will be one the the world's largest fishing vessels.

This ship has already aroused considerable attention because of the bold effort to obtain maximum flexibility, high speed to and from the fishing grounds, and satisfactory power output when trawling.

A deep-sea trawler of the 223-foot class and upwards requires a propulsion power in the region of 1,200 shaft horsepower to obtain a passage speed of about 11 knots, and the power required for trawling at 3-4 knots is of the order of 1,000 shaft horsepower. To achieve a comparatively small increase in passage speed, about twice the horsepower is needed and with conventional machinery this would result in the engines running at very much reduced output when trawling.

The owners of the <u>Cap Fagnet III</u> have overcome these difficulties by specifying Diesel-electric propulsion. This will give the vessel an increased power of 2,000 b.hp., effect a passage speed of between 12 and 14 knots, and avoid the harmful consequences of running the engines at half power for long periods when trawling.

Diesel power is provided by three engines. They are pressure-charged intercooled units, each developing 750 b. hp. at 750 r.p.m., and each driving two selfventilating and constant-speed generators. The generators are mounted in tandem; one is the propulsion generator, and the other an auxiliary generator used for supplying either the trawl winch motor or auxiliaries.

The propulsion generators each have a continuous output of $510\,\mathrm{kw}$. at $750\,\mathrm{r.p.m.}$, and the auxiliary generators each have a maximum output of $195\,\mathrm{kw}$. (one-hour rating) and a continuous rating of $150\,\mathrm{kw}$.

The three propulsion generators are coupled up in series, for feeding--also in series, the two propulsion motors. These motors, each rated at 950 hp. at 850 r.p.m. drive the propeller through a reduction gear which allows a higher motor speed within a reduced weight and size.

The generators can be coupled to the motors in the following combinations: Full power for passage--3 generators on 2 motors; trawling--2 generators on 2 motors; slow speed and hove to--1 generator on 2 motors.

The flexibility thus obtained is supplemented by simplified maintenance at sea. Of the 100 to 120 days duration of the average fishing trip, only 16 of these will be spent in passage. During the remainder of the time spent on the fishing grounds one of the engines can be shut down. With no separate auxiliary generator sets to be maintained, there is an obvious advantage in the reduction in the number of spares to be carried. Any one of the propulsion sets is capable of propelling the vessel and the risk of total immobilization is thus reduced to a minimum.

The ventilation of the generators and motors has been closely studied. To insure effective protection of the winding of the electrical machines (against the moist salty atmosphere and oil vapors in the engineroom), closed-circuit ventilation has been adopted, in spite of its complexity.

The controls for the propulsion generators and motors are fitted on the bridge and all maneuvering of the vessel is carried out from a control desk in the wheel-house. An automatic governor insures that the Diesel engines run at constant speed whatever the load.

To round out the story of Diesel-electric usage for trawlers, a British shipyard now is also building a vessel which will be so equipped.



German Federal Republic

RICH FISHING GROUND FOUND EAST OF GREENLAND: A German trawler which fished west of Iceland in March 1956 found another rich fishing ground only

80 nautical miles west of the Dohrn Bank in the same latitude as Angmagsalik on the east coast of Greenland, according to Dansk Fiskeritidende (April 6), a Danish fishery periodical. Dohrn Bank was found by the West German ocean research vessel Anton Dohrn last summer. The new bank is so rich in both cod and ocean perch that trawlers fill their holds in a short period.

More and more of the West German trawlers are fishing off Greenland. The trips take a few days longer than to waters off the Norwegian coast but the new grounds offer better possibilities in regard to the quality and quantity of the catch. A Bremen trawler, Herman Ahlers, returned from a 23-day trip with 5,065 boxes of edible fish or more than one-half million pounds of fish, mainly large ocean perch and cod.



Mending net on deep-sea trawler.



Greece

FREEZER-CATCHER BOAT COMPLETED FOR FISHING OFF NORTH AFRICAN COAST: The second Greek fishing vessel, the Evanghelistria (converted from the Grassholm) left Italy early in 1956 for the fishing grounds located in the Atlantic Ocean off the Mauretanean coast. The converted vessel has a gross tonnage of 484 and is propelled by a British-made 650-hp. engine. Other equipment includes up-to-date quick freezers and a cold-storage capacity of 220 metric tons. The vessel is owned by the same Greek firm that has been fishing Atlantic waters with the Evridiki. The speed of the new addition to Greece's deep-sea fishing fleet is reported to be 11 knots, according to the February 1956 Aleia.

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FREEZER-CATCHER BOAT COMPLETES FIRST TRIP: The Evanghelistria returned to her Greek home port on April 15 with a cargo of 210 metric tons of fish. The new trawler fished for 32 days off the Mauretanean coast of North Africa (Aleia, April-May 1956).

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FROZEN FISH TRIP ARRIVES FROM ATLANTIC OCEAN: The large freezer-equipped fishing vessel Evridiki arrived at Piraeus early in 1956 with 110 metric tons of frozen fish. The vessel fished off the Mauretanean coast of North Africa, according to the February 1956 Aleia, a monthly Greek fisheries review.



Haiti

COASTAL FISHERIES TO BE EXPANDED: The Haitian Department of Agriculture has formed a Fishery Office for the purpose of exploiting the coastal waters of Haiti. The Department of National Economy is cooperating, and has leased one small boat, the Santonia, which is owned by a Cuban company. The Government is not expected to buy any large amount of equipment until exhaustive tests with leased vessels have been made.

First operations were encouraging. In four hours of fishing in the Windward Passage off Môle St. Nicolas, 2,400 pounds of tuna and bonito were taken. A 90-minute test off the Caymite Islands in the Gulf of La Gonave produced 1,300 pounds of the same types. Fish ranged from 10 to 20 pounds each. Thazar (wahoo) and Chrysophrys (dolphin) were also taken in this area.

The Food and Agricultural Organization of the United Nations has had a fishery expert in Haiti for about one year. He is assisting in the present operation, points out a United States Embassy dispatch (April 13) from Port-au-Prince.



Iceland

GROUNDFISH CATCH LOWER JANUARY-MARCH 1956: The groundfish catch for the first three months of 1956 was down about 12 percent (15,100 metric tons) from the 119,900 tons caught in January-March 1955. The decline was due to a late start in January and a smaller catch in February 1956. The catch in March 1956 was close to the high level of March 1955, but represented a smaller catch

Production of Groundfish Fillets, 1953-55						
Product	1955		1953			
	(1,000 Lbs.)					
Blocks, frozen (for fish sticks):						
Cod	7,931		-			
Haddock	3,356		-			
Ocean perch	56		-			
Other (wolffish)	46		-			
Total blocks	11,389	27,917	-			
Fillets, frozen (for sale as fillets):						
Cod	52,977		43,417			
Haddock	3,993		3,944			
Ocean perch	44,378		16,901			
Flounder	126		342			
Other	3,447		3,229			
Total fillets	104,921	78,259	67,833			
Grand total	116,310	106,176	67,833			
Estimate of unreported						
production	-	5,309	2,713			
Total production of fillets and			70 540			
blocks	116,310	111,483	70,546			

per boat since the fleet was larger in 1956. The peak catches of groundfish usually occur in April, according to a May 3 dispatch from the United States Embassy in Reykjavik.

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GROUNDFISH FILLET PRODUCTION, 1953-55: Iceland's production of groundfish fillets (including fillet blocks for use in manufacturing fish sticks) has shown a steady increase from 1953 through 1955. The production of fillet blocks declined 59 percent from 1954 to 1955, but this drop was more than offset by an increase in the production of fillets for sale to consumers as fillets.



India

GOOD POTENTIAL MARKET FOR BOATS AND ENGINES: The potential market in India for small fishing boats, small marine engines, nylon nets, and other fishing gear has come a step nearer realization through the recent work of experts of the U. N. Food and Agricul-

Four factors point the way: (1) an FAO master fisherman has demonstrated to Indian fishermen that with nylon bottom gill nets they can increase catches by 500 percent and earnings by 300 percent; (2) the same master fisherman had discovered a vast shrimp trawling area extending at least 140 miles down the Malabar coast, from Mangalore south to Beypore; (3) he has also found evidence of substantial stocks of sardines, mackerel, catfish, sharks, and soles on the east coast of India; and

ture Organization.



Fishing boat of India.

(4) the Madras State Government has drawn up a Five-Year Plan for the development of fisheries, including the provision of mechanized boats. The first twenty 30-foot boats, designed by FAO naval architects, are nearing completion.

The shrimp resource is a veritable gold mine, according to the FAO master fisherman. It is about 4 miles wide and anywhere along its 140 miles length you can catch 100 pounds of shrimp an hour. The FAO 22-foot boat loaned to five fishermen trained by the FAO master fisherman caught 11,306 pounds of shrimp and fish from March 21 to April 18. Another bigger boat, a 35-footer, fishing during the same period with a crew trained by the same master fisherman, caught 20,111 pounds.

"These catches are ten times bigger than anything the local fishermen have ever caught before and their earnings, consequently, have greatly increased," continued the FAO master fisherman. "Naturally, they are tremendously keen to work the new fishery but they need mechanized boats, shrimp trawls, winches and wire warps. The men who finance the fishermen have the money to buy equipment so a great opportunity exists for enterprising manufacturers."

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BULL-TRAWLING OPERATIONS SUCCESSFUL: Bull-trawling by the two fishing vessels Ashok and Pratap of the Pilot Deep Sea Fishing Station, Bombay, has indicated its immense potentialities off the northwest coast of India. These vessels were formerly using otter-trawl nets but were altered for bull-trawling at the end of 1953

During the 1953/54 season, an average catch of nearly 1,350 pounds of fish per hour was obtained during an experimental operation (about 2.5 times more than by otter trawling). The quantity and percentage of commercially-valuable fish caught by bull-trawling also compared very favorably with that caught by otter trawling.

In February 1955 a record catch of 12 metric tons of fish was obtained in a single haul of $1\frac{1}{2}$ hours duration off Dwarka, just outside the Gulf of Kutch. The total catch of this voyage was 54 tons, and the average catch per hour of fishing about 2,058 pounds. This is stated to be the highest over-all average obtained so far for trawling in Indian waters, reports the <u>Current Affairs</u> <u>Bulletin</u> (April 1956) of the Indo-Pacific Fisheries Council

Indonesia

LONG-LINE TUNA FISHING MAKES GOOD START: Indonesia's first Diesel long-line tuna vessel completed six training voyages during the Djakarta area fishing season. The 100-ton 89-foot Bima is the first of four vessels which will form the nucleus of Indonesia's new long-line industry.

Long-Line fishing has been successfully used for years by the Japanese in the waters surrounding Indonesia. With <u>Bima</u> and her sister ships, Indonesia can for the first time exploit these waters which are one of the world's richest sources for deep-sea fishes and potentially the largest new source of protein available in Indonesia.

The tuna long-line fishing program is being carried out by the Indonesian Sea Fisheries Service with assistance from the U.S. International Cooperation Administration (ICA). The Sea Fisheries Service has provided the Rp. 800,000 vessel (US\$70,000). ICA has provided an adviser and around US\$9,000 of fishing equipment.

During <u>Bima's</u> six voyages south of the Sunda Strait, the ICA long-line technician and a man from the Sea Fisheries Institute instructed the 17-man crew in long-line fishing. Incidental to learning, the crew caught 15,000 pounds of tuna and shark which were sold at Pasar Ikanfor Rp. 26,485 (US\$2,300).

Developments of the long-line industry are expected to contribute substantially to the Sea Fisheries goal of doubling its present yearly catch, points out the Indo-Pacific Fisheries Council in its <u>Current Affairs Bulletin</u> of April 1956.

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SHRIMP FISHERY BEING DEVELOPED: A U.S. International Cooperation Administration trawl fishery expert, who has been assigned to the Indonesian Government for two years, is actively engaged in the development of the Indonesian shrimp fisheries. A native of Florida with much experience in shrimp fishing and in construction and maintenance of this type of vessel, he has begun his work with shrimp-trawl experiments in the fishing area off South East Kalimantan (Borneo).



Israel

CAMPAIGN TO EAT MORE SEA FISH PROMOTED BY PRESS TOUR: The Israel Government's program to boost the consumption of sea-caught fish was given new impetus during March by an organized press tour of representatives of the entire Israel press, arranged jointly by the U.S. Information Service and the U.S. Overseas Mission (USOM).

Israel Government plans to reduce the expenditure of foreign currency on imported protein foods place great emphasis on a considerably increased fishing industry and the introduction of sea fish as an important part of Israel's diet of animal-protein foods.

The newsmen were taken for an overnight trip on a trawler belonging to the Israel fishing fleet to the new fishing grounds recently discovered with the help of the USOM Sea Fisheries Specialist, who was on board. Top officials of the Sea Fisheries Department of the Government also took part in the trip, and apart from "Moonlight and Oysters," the newsmen had an opportunity to learn a great deal about what was being done to supply the protein-hungry population with an ever increasing supply of sea fish.

The trip paid good dividends from every point of view with excellent press coverage driving home the availability of good supplies of tasty fish. The help given to this young industry through U. S. Technical Assistance was also acknowledged.



Japan

NORTH PACIFIC SALMON INVESTIGATION PROGRAM: The Japanese Ministry of Foreign Affairs has informed the Embassy of the United States in Japan that Japanese research vessels will engage in the salmon and trout investigation program in the North Pacific area this summer in accordance with the decision reached by the International North Pacific Fisheries Commission.

The vessels that will be conducting the investigation from May 15 to August 20 are: Etsuzan Maru (152 tons), Takuyo Maru (172 tons), and the Eike Maru (111 tons).

The Etsuzan Maru will operate in the North Pacific area within 40° - 49° N. latitude and $\overline{165^{\circ}}$ - $\overline{180^{\circ}}$ W. longitude. The Takuyo Maru will operate within 40° - 49° N. latitude and 160° - 175° E. longitude; and the Ejko Maru will operate in the Bering Sea within 54° - 62° N. latitude and west of 175° W. longitude.

The specialists aboard the vessels will collect operation records, and carry out oceanographic and biological investigations. (U. S. Embassy, Tokyo, May 2.)

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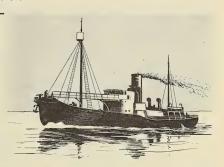
PACIFIC SALMON FISHERY OFF TO A GOOD START: As of May 20, 1956 the catch of salmon by the Japanese salmon fleet fishing east of 170 degrees east longitude and between 48-55 degrees north latitude amounted to 3,100,000 salmon, according to a dispatch, dated May 25, from the United States Embassy in Tokyo. Salmon fishing in this area began on May 3 and the catch is reported to be about 35 percent greater than the catch for a comparable period in 1955.

The relatively large early catch does not necessarily mean a large seasonal catch in this area as warm currents have raised the water temperatures further northward than is normal. The fishing industry is of the opinion that the increase in temperatures will cause the salmon to migrate inshore towards their spawning streams earlier than usual. Because of this factor, some observers predict a salmon catch in the unrestricted area of 15-20 million fish.

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JAPAN-RED CHINA FISHERIES COUNCIL HOLDS CONFERENCE: The annual conference to negotiate extension of the unofficial fisheries agreement between the private fishing industries of Japan and Red China was held in Peiping on April 27, 1956. The talks were expected to last about one month, according to an April 13 dispatch from the United States Embassy in Tokyo. The agreement last year was signed by private fishing interests from each country and the delegates to this conference represent private fishing companies, fishermen, and fishermen's unions.

ONASSIS WHALING FLEET PUR-CHASED: Details relating to the purchase of the Panamanian-registered Aristotle Onassis whaling fleet consisting of one factoryship and 15 catcher boats have been completed, according to a May 18, 1956 dispatch from the United States Embassy in London. The Japanese firm, Kyokuyo Hogei KK., announced that formal possession of the fleet will take place at Rotterdam. Earlier reports of the purchase indicated that the purchase price for the factoryship Olympic Challenger was close to US\$4 million and that for the 15 catcher boats about US\$3.5 million.



Japanese whale catcher.



Mexico

"RED TIDE" REPORTED OFF WEST COAST: The coastal waters located off Mexico's west coast port of Manzanillo has suffered from an invasion of "Red Tide," according to newspaper reports transmitted on May 8 by the United States Embassy in Mexico City.

The "Red Tide," which is a popular name given to the sudden appearance of enormous numbers of a one-cell marine organism of the dinoflagellate group, has been reported in various parts of the world. Indications are that the invasion reported off Manzanillo has similar characteristics to previously-reported invasions of this marine organism.

Tremendous quantities of dead fish have been washed up on the beaches. Port authorities at Manzanillo have assigned squads of workmen to the task of cleaning up the beaches. This is the first time that an invasion of this type has been reported from this area.

The "Red Tide" was reported to have extended over a wide area and is believed to have originated around the Island of Islas Marias.

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MERIDA FISHERIES TRENDS, JANUARY-MARCH 1956: The Mexican area of Merida, which includes the ports of Campeche and Ciudad del Carmen, exported close to 3.1 million pounds of shrimp to the United States during January-March 1956. Other exports to the United States included 94,800 pounds of frozen fish, 3,065 pounds of shark fins, and 12,300 pounds of shark skins, states a May 3 dispatch from the United States Consul in Merida.

Due to a prosperous year in 1955, there has been a considerable expansion in shrimp vessel construction in the cities of Campeche and Ciudad del Carmen. It is estimated that about 50 percent of the new construction will contribute favorably to the shrimp fishery but the balance is believed to be an overextension of the future economic prospects of the Mexican shrimp industry.

Average prices for shrimp delivered to Brownsville, Texas, in U. S. cents a pound for the January-March period for frozen 15-20 count headless were: January, 80; February, 78; and March, 75. Due to the high price level there was considerable resistance on the part of United States buyers.

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FISHING FEES FOR FOREIGNERS INCREASED: Increased fees and taxes for foreigners commercialor sport fishing in Mexican waters became effective on May 16 in accordance with new decrees published in the May 15 <u>Diario Oficial</u>, reports the United States Embassy at Mexico City in a May 16 dispatch.



New Zealand

<u>NEW WHALING STATION</u> <u>ESTABLISHED</u>: A new company has been incorporated in New Zealand for the purpose of operating a whaling station on Great Barrier Island in the northernmost part of the country, states an April 23 dispatch from the United States Embassy in Wellington.

The new Great Barrier Island station is expected to operate during the 1956 whaling season. The cost of building the station is $\pm 55,000$ (US\$154,000). Almost all production of oil will be exported with earnings in foreign exchange of about $\pm 140,000$ (US\$431,000) expected annually. Exports will be chiefly to the United Kingdom and to Europe. The new station will also produce meat byproducts such as meat meal and meat for pet food.

The only other whaling station operating in New Zealand is in the Tory Channel at Te Awaiti on Cook Strait. That station has an average catch of about 115 whales annually.

Norway

CANNED FISH TRENDS, FIRST QUARTER 1956: During the first quarter of 1956 a total of 7,000 metric tons of Norwegian canned fish valued at 30 million kroner (US\$4.2 million) were exported, compared to 8,300 tons valued at 35.6 million kroner (US\$5.0 million) in the first quarter of 1955. The canning industry blames the decrease primarily on last year's poor brisling catch. Canning of herring and kippers during the first quarter of this year was also below the first quarter 1955 pack, according to the American Embassy at Oslo (May 11, 1956).

Government regulations on the canning industry were eased last February to permit more factories to pack herring and others to expand their production. This liberalization has not yet had any appreciable result, however. Few producers are willing to start packing brisling and small herring because the poor catches make brisling supplies doubtful.

Packing of herring and kippers is expected to be somewhat larger this year than last, but the increase will not be enough to offset losses due to the short supply of brisling.

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AUTOMATIC FEEDING AND SORTING MACHINE FOR HERRING DEVELOPED: A machine which will sort and feed herring automatically to other machines which head, eviscerate, or fillet the herring has been constructed by Peter J. F. Christie, an engineer in Bergen, Norway, according to Fiskaren (May 8), a Norwegian fishery periodical. The new machine will end the need for sorting and then feeding herring singly, by hand, with the head and belly properly directed, to the machines which process them further. The machine takes the herring directly from the shortage bin, sorts out the small herring, and then delivers two or three herring a second with the heads and bellies pointed in the directions desires. Headed herring can be handled equally well.

The machine weighs about 220 pounds, is the size of a whole herring barrel, and will cost less than US\$700 (5,000 kroner). Tests of its ability to operate also on shipboard will be made this summer on some of the Norwegian vessels which operate on the high seas herring fishery off Iceland.



Panama

RED SHRIMP IDENTIFIED AS "PENAEUS BREVIROSTRIS": The "red" or "pink" shrimp which were plentiful in the Gulf of Panama for about three weeks in March 1956 are reported to be <u>Penaeus</u> <u>brevirostris</u>, as distinguished from the more common form, <u>P</u>. occidentalis.

Although the "red" shrimp have been of a good size (21-25 a pound heads off), they are smaller than the \underline{P} , occidentalis which commonly run to 15 and under (headless) to the pound.

Based upon preliminary information, the Cooperativa Pesquera, S. A., handled 350,000 pounds of the "red" shrimp and the total catch of this species during the short three-week season may exceed 500,000 pounds. The catch would have been higher except for the four-day Easter holiday which occurred in the middle of the run, states a May 24 dispatch from the United States Embassy in Panama.

Note: Also see Commercial Fisheries Review, July 1956, p. 74.

Peru

BASE PRICES FOR WHALE MEAL AND SWORDFISH EXPORT DUTIES REVISED: The base cost price of 1,261.50 soles (US\$66.39) a short ton of whale meal to be used temporarily for the assessment of export duties pursuant to a Supreme Resolution of February 7, 1955, was changed to 1,944.10 soles (US\$102.32) by a Peruvian Supreme Resolution of January 12, 1956, according to a notice which appeared in the weekly bulletin of the Lima Chamber of Commerce for February 1, 1956. According to the same source, the base cost price for frozen swordfish, also for purposes of export tax assessment, was fixed at 8,240 soles (US\$433.68) a short ton by the same Supreme Resolution. These prices were scheduled to remain inforce until April 1956 when the local authorities were to revise them, states a March 7, 1956 dispatch from the United States Embassy in Lima. Note: Conversion value: US\$1 equals 19 soles.



Republic of the Philippines

CANNED JAPANESE ANCHOVIES CLASSIFIED AS SARDINES: The Philippine Bureau of Customs ruled on April 16, 1956, that all canned Japanese anchovies packed sardine style in tomato sauce, regardless of brand, are included in the classification of canned sardines and are exempt from the payment of the special import tax.



Portugal

CANNED FISH PACK, JANUARY OCTOBER 1955: The pack of canned sardines in oil or sauce for January-October 1955 amounted to 21,135 metric tons (net weight). The October 1955 pack was 2,921 tons, about 39 percent less than the 4,797 tons packed in September 1955.

Portuguese Canned Fish Pack, January-October 1955						
Product	Net Weight	Canner's Value	Product	Net Weight	Canner's Value	
	Metric	1,000		Metric	1,000	
	Tons	US\$		Tons	US\$	
Sardines in brine	798	122	Tuna in brine	69	33	
Sardines in oliveoilor sauce .	21,135	11,315	Tuna in olive oil	854	721	
Sardinelike fish in brine	2,095	616	Tunalike fish in olive oil .	102	65	
Sardinelike fish in oil	2,709	1,478	Other species (including			
Anchovies, rolled& fillets	1,285	1,380	shellfish)	576	300	
(Continued in next column)			Total	29,623	16,030	
Note: Values converted to US\$ equivalent on the basis of 28,75 escudos equal US\$1.						

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CANNED FISH EXPORTS, JANUARY-DECEMBER 1955: Portuguese canned fish exports totaled 6,478 metric tons (340,900 cases), valued at US\$3.3 million, during December 1955; and 63,701 tons, valued at US\$32.4 million, during January-December 1955.

Portugal's exports of canned fish in December 1955 declined less than 1 percent when compared with the previous month, according to <u>Conservas de Peixe</u>, March 1956. During January-December 1955 Germany was the leading receiver with US\$6.1 million of canned fish (about all sardines in oil), followed by Great Britain with US\$4.8 million (principally sardines), Italy with US\$4.7 (principally

sardines and tuna), and the United States with US\$4.0 million (principally 3,306 tons of sardines in oil or sauce, 43 tons of tuna and tunalike fish in oil, and 2,019 tons of anchovies). Exports of canned fish to these 4 countries (during the Jan.-Dec. period) amounted to 60.5 percent of the total exports.

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FISHERY TRENDS, DECEMBER
1955: Sardine Fishing: The catch of the
Portuguese sardine fleet declined in December 1955 to 5,911 metric tons, or about 20 percent less than the November
1955 catch. The December 1955 sardine

catch was valued at about US\$1.0 million ex-vessel as compared with US\$1.2 million in November 1955.

Dec. 1955 Jan.-Dec. 1955 Species Metric | 1,000 1,000 Metric Tons US\$ Tons US\$ 25,066 5,192 Sardines in olive oil 2,538 51,425 Sardinelike fish in olive oil..... 405 4.860 3.518 Sardines & sardinelike fish in brine 330 72 2,152 415 Tuna & tunalike in olive 2,251 1,667 170 129 Tuna & tunalike in 393 33 773 134 994 214 1.644 Mackerel in olive oil . . . Other fish..... 17 596 314 6,478 3,328 63,701 32,367

Portuguese Canned Fish Exports, December 1955

and Comparisons

The sardine canning industry absorbed 73 percent (4,303 tons) with most of the balance consumed fresh. The port of Matosinhos lead all others with a catch of 4,849 tons of sardines and contributed 3,815 tons (ex-vessel value US\$678,591) to the canning trade.

Other Fish: The landings of fish other than sardines totaled 3,970 tons, valued at US\$334,692 ex-vessel. The catch of fish other than sardines was 90 percent chinchards (3,560 tons), followed by tuna (357 tons), and 52 tons of mixed (mostly mackerel), the March 1956 Conservas de Peixe reports.

FISHERY TRENDS, APRIL 1956: New Sardine Fishing Season: In the past, the fishing season in Northern Portugal was from May I to January 31 and in the southern part of the country from April 1 to December 31. A recent order of the Ministry of the Navy establishes a uniform fishing season for both parts of the country to begin on April 15 and end on January 15. However, fishing circles state that this advance in the date is of no advantage for Northern Portugal since fish of suitable quality and size for packing are normally available from June onwards only.

One of the reasons given by official circles for creating a uniform fishing season is that under the old system fishermen from the South came North for the first month of the southern season and fishermen from the North went South for the last month of the northern season. This complicated official licensing and controls, states a May 3 dispatch from the United States Consul at Oporto.

<u>Fishermen's Work Contract</u>: With the opening of the new season on April 15 fishermen began signing their contracts. As in last year's season, they signed the new type of contracts as well as the old type and have the option of receiving compensation according to the one they consider to be more profitable to them. Up to the present time only a few crews are fishing.

Canned Fish Exports to the United States: Delegates of the Portuguese agency Copnor-Conservas de Peixe, Lda., have been in the United States on an investigative and promotional tour to increase exports of Portuguese canned sardines to the United States.

Copnor decided that the sales agents in the United States of the individual member firms will in the future place their orders through Copnor, which will coordinate orders and production to the best interests of its members.

The canners, together with the Portuguese Government officials, are also studying the method of avoiding excessively high prices on fresh fish, in order not to lose foreign markets, which are now objecting to the high prices of Portuguese sardines and are consequently beginning to give preference to canned fish from other sources.



Spain

FISHERIES TRENDS, APRIL 1956: In the Bilbao area, after a prolonged period of forced inactivity because of inclement weather and scarcity of fish, the coastal fishermen from the Cantabrian littoral began working practically day and night to handle the large runs of anchovy which appeared in coastal waters the last days of March 1956 and through most of April. The catch has generally been of good canning quality, states a May 15 United States consular dispatch from Bilbao.

In the Vigo area, April 1956 was a poor month for the fishing industry due to the lowest catches in two years. Landings of the cheaper varieties such as castaneta and jurel were abundant at Vigo.

The Vigo fish canneries in April 1956 purchased 426,000 pounds of fresh fish, or about 6 percent of the total catches entered through the Vigo Fish Exchange. Al-



Unloading Sardines

though this was more than in March (263,000 pounds), it was far less than in April 1955 when the canneries took 2.1 million pounds of fresh fish.

The scarcity of tin plate continued to hinder the normal operation of the fish canneries. Since the main fishing season commences in June, the tin plate situation may become critical unless the Government authorizes sufficient imports. It is reported that some of the canneries have already brought the matter to the attention of the appropriate Spanish authorities and that they have been assured that the Government will make every effort to solve this

problem. Olive oil is also in short supply but there are indications that the situation will not become serious.

The canneries are concerned over the recent increase in the price of gold pesetas (from 357.70 paper pesetas to 715.00 paper pesetas per 100 gold pesetas). It has been customary for the fish canneries to apply for the importation of a certain quantity of duty-free tin plate under the Temporary Admission Law, and they are allowed two years to export fish in the duty-free tin plate. Moreover, if the export quota has not been filled, a heavy fine is assessed in addition to the payment of customs duties on the imported tin plate. Since the gold peseta enters into customs duties, the new rate is considered an extra tax on the fish-canning industry and hurts the canneries with a small export trade. The entire industry is affected by the new price of the gold peseta, since some of the imported tin plate is used in canning fish for domestic markets, a May 14 United States consular dispatch from Vigo points out.



Sweden

FROZEN FISH DEMAND INCREASES: Consumption of quick-frozen fish in Sweden should equal approximately 9,000 metric tons in 1956, which will mean that only about 20 percent of the Swedish demand can be covered by locally-frozen fish, according to a trade report which appeared in the Goteborg newspaper $\underline{\text{Ny Tid}}$ on May 9, 1956. The balance will be imported, chiefly from Norway. During the next five years it is expected by the trade that the domestic consumption of frozen fish will rise to 20,000-25,000 metric tons a year.

The present plant capacity in Sweden for the preparation and freezing of fish is reported to come close to handling the quantity of white fish that is available for freezing. Other types of fish which are well suited are whiting and haddock, but during a normal year there is not a very large surplus of these types available after the fresh fish demand is satisfied. Cod is also a variety that is well adapted for freezing but, according to the trade, offerings are adversely affected by the decline in Baltic cod fishing activity. On the other hand, Baltic herring, other herring, and mackerel are supplied to the freezing plants in good quantities, states a United States consular dispatch (May 11, 1956).



Turkey

INTERNATIONAL FISHERY EXHIBITION TO BE HELD SEPTEMBER 15-22, 1956: An exhibition of fishing equipment is being organized by the Government of Turkey to coincide with the Fourth Meeting of the Food and Agricultural Organization (FAO)-sponsored General Fisheries Council for the Mediterranean, which will meet at Istanbul, Turkey, from September 17-22, 1956.

The exhibition of fishery equipment will take place from September 15-22, 1956. Exhibition space will be available, free of charge, and special arrangements will be made to enable firms to demonstrate echo-sounders. The Turkish Foreign Trade Department will authorize the duty-free temporary import of equipment for display at the exhibition. Sales of equipment by exhibitors may be made within the limits of trade agreements between Turkey and the country of origin concerned.



Union of South Africa

PRICE CONTROLS ON HAKE AND CANNED FISH REMOVED: Price controls, in effect for several years, on hake and canned fish were removed on February 24, 1956, according to the March 1956 issue of The South African Shipping News and Fishing Industry Review, a South African trade publication.

Hake and canned fish, which are two of the most important products of the South Africa fishing industry, will now be able to find their own price on the South African market.



United Kingdom

SILVER COD TROPHY FOR 1955 AWARDED TO HULL TRAWLER: The 1955 competition for the Silver Cod trophy, which is awarded by the British Trawlers' Federation to the distant-water vessel that catches and lands the most fish, was won by the 790-ton oil-fired Hull steam trawler Kirkella.

The record-breaking catch of 2,911 long tons (6.4 million pounds) landed by the Kirkella exceeded that made by the 1954 winner, the Arctic Warrior, by 249 tons.

The <u>Kirkella</u> catch was valued at US\$364,700, compared with a value of about US\$343,800 for the 1954 winner.

The <u>Kirkella</u> during the course of the year spent 339 days at sea, mostly on the Arctic fishing grounds, and landed 18 trips, an average of about 18.8 days a trip. The winner in 1954 made 16 trips in 330 days at sea and averaged 20.6 days a trip. The winners in both years carried crews of 20 men, according to <u>The Fishing News</u> of April 13, 1956, a British fisheries trade periodical. The average annual catch per man on the <u>Kirkella</u> was 145 tons (319,700 pounds).

The runner-up for the trophy in 1955 was the 794-ton Hull trawler <u>Kingston Jacinth</u> which landed 2,864 tons (6.3 million pounds), valued at US\$344,200.



The British silver cod trophy to be presented annually to the distant-water trawler with the largest total catch for the year.

The President of the British Trawlers' Federation, commenting on the award, said that the results of the 1955 competition were astonishing. He added that this was most gratifying as more and more fish were being landed by British trawlers.

The trophy, introduced in 1954 by the Federation as an incentive to boost catches, consists of a silver model of a leaping cod mounted on a manogany stand with silver waves on which will be inscribed the names of the winning crew.

Note: See Commercial Fisheries Review, February 1956, p. 53.

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DISTANT-WATER TRAWLERMEN DOUBLE LEVY FOR ADVERTISING: In order to

capture an increasing share of the United Kingdom markets for food, British Distant Water trawlermen are increasing their fish sales promotion fund by doubling the voluntary and cooperative levy on all landings at Hull, Grimsby, and Fleetwood. It will now be about 14 U. S. cents (1s.) for every 130 pounds of fish landed.

The British Trawlers' Federation advertising campaign is being handled by professional advertising and public relations firms.

The head of the advertising firm stated that with British distant-water trawlers bringing in more and more fish and of greater variety, we intend to do everything we possibly can to stimulate consumer demand. We plan to use both the national and provincial press, national magazines, and television. We are also producing a color film and recipe books in color for housewives.

"This will be by far the heaviest and most potent campaign yet undertaken to sell fish to the British housewife, with a total budget for 1956 of about US\$784,000.

"We are also employing continuous consumer research to determine trends in buying and using habits." (The Fishing News, April 20, 1956.)



Yugoslavia

SEA FISHING ASSOCIATION TO AID IN BUILDING FISH CANNERY IN INDIA: The Yugoslav Association of Sea Fishing has accepted a request from a firm located in India to give technical assistance for the building of a fish cannery in the vicinity of Manjolar. The Yugoslav industry is reported to have agreed to deliver most of the necessary equipment, such as boilers, electrical installations, and other apparatus. (March 29, 1956 report from the International Cooperation Administration in Belgrade.)





Department of the Interior FISH AND WILDLIFE SERVICE

BROAD FISHERIES LEGISLATIVE PROGRAM PROMOTED:

Enactment of comprehensive legislation to implement the White House announcement of June 4, 1956, was urged June 8 by the U. S. Department of the Interior.

The Department also announced that it is taking prompt action to create by July 1, 1956, a separate Bureau of Fisheries under which its activities in the fishery field can be coordinated appropriately with its other related conservation functions.

The new Bureau of Fisheries will be established through reorganization of the present Fish and Wildlife Service into two separate bureaus of equal status. One bureau will handle fish, the other the Nation's wildlife resources.

A draft of the proposed legislation was sent to the House and the Senate June 8 and introduced in the Senate June 11 as S. 4021 (Payne).

The Bureau of Fisheries will be responsible for the fisheries conservation program now under the branches of game fish and hatcheries, fishery biology, commercial fisheries, Alaska fisheries, and foreign activities.

In a similar status, the bureau handling wildlife resources will carry on the many important activities now under wildlife refuges, game management, wildlife research, and predator and rodent control.

The organization pattern will make it possible, Mr. D'Ewart said, for both bureaus to work closely with each other

and with other agencies of the Department on river basin studies, as well as on various Federal aid matters.

The Assistant Secretary said that as soon as the organizational pattern of the two bureaus has been established, the staffing of the top personnel positions will be announced. He pointed out that these are the first new agencies to be established in the Department of the Interior with bureau status since 1946 when the Bureau of Land Management was created.

The former Bureau of Fisheries of the Department of Commerce and the old Bureau of Biological Survey of the Department of Agriculture were brought into the Department of the Interior in 1939 and then merged into the Fish and Wildlife Service in 1940.

It was more than 85 years ago, during the administration of President Ulysses S. Grant, that the Federal Government began its battle to protect and maintain the fishery resources of this country in order to assure a supply of marine foods and to assure continuation of the sport of angling. Aware of the alarm which was spreading because overfishing was placing a greater strain on this natural resource than Nature, without help, could replenish, the Congress passed a joint resolution on February 8, 1871, authorizing the appointment of a Commissioner of Fish and Fisheries for the purpose of investigating the alleged decrease of the food fishes of the seacoasts and lakes of the United States, and to suggest remedial measures.

The United States Commission of Fish and Fisheries remained an independent agency until July 1, 1903, when it was included by law in the new Department of Commerce and Labor, and from that time on was designated as the "Bureau

of Fisheries." When that Department was subdivided in 1913, the Bureau of Fisheries became a part of the Department of Commerce where it remained until its transfer to Interior on July 1, 1939.

What is now the wildlife branch of the Fish and Wildlife Service had its inception in 1885 when the 48th Congress appropriated \$5,000 "for the promotion of economic ornithology, or the study of the interrelation of birds and agriculture, an investigation of the food habits, and migrations of birds in relation to both insects and plants.

The work was made a branch of the Division of Entomology in the Department of Agriculture. One year later the work was separated from the Division of Entomology and became an independent "Division of Economic Ornithology and Mammalogy." In 1896 the Division of Economic Ornithology had its name changed to Division of Biological Survey. On March 3, 1905 it attained Bureau status and thereafter became known as the Bureau of Biological Survey.

The Wildlife Division of the Service is responsible for conducting waterfowl surveys and drawing up the annual regulations for the hunting of wild ducks and geese.

The text of the letter sent by Assistant Secretary D'Ewart to the Congress on June 8 follows:

"Enclosed herewith is a draft of a proposed bill, 'To encourage the development, marketing, and distribution of domestic fishery resources of the United States, and for other purposes.'

"We recommend that the proposed bill be referred to the appropriate committee for consideration, and we recommend that it be enacted.

"This Department, which is the Federal agency primarily responsible for conservation of the Nation's fisheries and related activities, has made a careful study of the several legislative proposals that have been presented to the Congress for consideration. These proposals have been studied also by various committees of the Congress and we have

been pleased to participate in the consideration of those proposals. The provisions of the enclosed draft of bill should meet with approval from broad segments of our Nation which have been interested in the proper administration of Federal functions in the field of fisheries. We have been equally concerned with problems of recreational and commercial aspects of our fish resources.

"We believe it is generally recognized that the Fish and Wildlife Service of this Department has performed many valuable services to the fishing industry. With the growth of our national economy, and with changing international conditions, we recognize that many factors bear upon the welfare of the Nation's fisheries and the industries dependent thereon. A careful evaluation is warranted concerning the proper role of the Federal Government in this field.

"We believe this proposed legislation will, in general, be self-explanatory. In recognition of the need to render appropriate financial assistance in this field, section 3 of the measure would establish a 'Fisheries Loan Fund' with initial capital of \$10,000,000, and which would operate as a revolving fund. In this connection, you will note that section 5 of the draft of bill provides that in order to avoid duplication of activities and to minimize expense in carrying out the provisions of the Act, the Secretary of the Interior shall use, whenever practicable, the available services and facilities of other agencies and instrumentalities of the Federal Government on a reimbursable basis. We anticipate, accordingly, that such authority will be used in administrating the loan fund.

"We desire also to call your attention, in particular, to section 7 of this proposed legislation. That section will have the important effect of removing the present \$3,000,000 limitation now in effect concerning the use by this Department of Saltonstall-Kennedy Act funds for purposes of the Act. The authorization for transfer of the funds in question to this Department for the prescribed purposes would be continued on a permanent basis. Section 9 of this proposed

legislation would repeal certain Acts or parts of Acts that, with the enactment of this proposed legislation, will become obsolete and which for the most part will be superseded by such proposed legislation.

"We propose to carry out the functions that would be authorized by this proposed legislation through a separate Bureau of Fisheries in this Department. That Bureau will administer our functions in both the commercial and recreational fishery field. We believe this will be in the public interest and will promote good administration. Our activities in this field of public administration can be coordinated appropriately with our other conservation and related activities. At the same time, important questions of policy relating to the fisheries will receive full consideration and attention by this Department."

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DEPARTMENT'S SOLICITOR STATES ALASKA'S AREA-LICENSING PROGRAM LEGAL:

The Department of Interior's Solicitor, J. Ruel Armstrong, in a letter to Fish and Wildlife Service Director John L. Farley held in May that the proposed area-licensing program for Alaska set to begin for the 1956 season is completely legal.

The Act of June 6, 1924, together with several suplementary acts provides the basic authority for regulations of Alaska commercial fisheries, according to Armstrong. Under this authority, the Director may "fix the size and character of nets, boats, traps or other gear or appliances to be used therein; limit the catch of fish to be taken from any area and make such regulations as to time, means, methods, and extent of fishing as he may deem advisable."

In the court case, Dow vs. Ickes, the court declared of the Interior Department authority, "Broader discretion hardly could have been conferred. The power to discriminate is geographical, temporal, mechanical, quantitative and selective as to different varieties of fish ... No standard for making

discriminations is prescribed, except the general purpose of conservation and the limitation concerning monopoly ..."

The problem at hand for the 1956 season evolves around whether the Director has the authority to prohibit boats in one area from fishing another. The Solicitor stated that if the Secretary has the authority to limit the number of gear in an area he also has the authority to require that the "operation of such gear is limited to the area for which permission is granted."

Commenting on the Solicitor's opinion, Director Farley said that it appears that the salmon fisheries along the entire Pacific Coast are suffering from an influx of too much gear.

SUOMELA PROMOTED TO NEW FISH AND WILDLIFE SERVICE POST: The promotion of Arnie J. Suomela,

of Portland, Ore., from Assistant Di-



Arnie J. Suomela

rector of the Fish and Wild-life Service, in charge of fish-eries, to a recently created post of Associate Director was announced May 17 by Under Secretary of the Interior Clarence A. Davis.

In his new capacity as As-

sociate Director, Suomela will serve as general deputy to Director John L. Farley in directing the over-all activities of the Service including fisheries. The promotion became effective on May 15.

Suomela was appointed to the position of Assistant Director of the Service in November 1953 by former Secretary of the Interior Douglas McKay. He entered on duty in the Washington office of the Service on January 11, 1954.

Suomela is one of the United States Commissioners on both the International Commission for the Northwest Atlantic Fisheries and the International Pacific Salmon Fisheries Commission. He is a member of the American Fisheries Society and the Pacific Fisheries Biologists.

* * * * *

WHALING REGULATIONS PUBLISHED:

The rules and regulations governing the capture and rendering of whales were published in the Federal Register on April 18 and became effective May 16, 1956. The rules and regulation as published follow:

PART 151 WHAT ING PROVISIONS

Basis and purpose. The act of August 9, 1950 (64 Stat. 421; 16 U. S. C. 916-916.1), known as the Whaling Convention Act of 1949, implements the International Convention for the Regulation of Whaling signed at Washington, under date of December 2, 1946, by the United States of America and certain other Governments (62 Stat. 1716). Section 12 of the Whaling Convention Act of 1949 authorizes the Secretary of the Interior to adopt such regulations as may be necessary to carry out the purposes and objectives of the Convention, the regulations of the International Whaling Commission, and the said Whaling Convention Act of 1949.

By Notice of Proposed Rule Making published in the FEDERAL REGISTER on July 22, 1955 (20 F. R. 5258), the public was invited to submit written data, views, or arguments in connection with regulations proposed to be adopted by the Secretary of the Interior to give effect to Articles V, VII, VIII, and IX of the International Convention for the Regulation of Whaling and in furtherance of the responsibilities imposed upon the Secretary by section 12 of the Whaling Convention Act of 1949. Such written views were required to be filed with John L. Farley, Director, Fish and Wildlife Service, Department of the Interior, Washington 25, D. C., not later than 30 days from the publication of the notice in the FEDERAL REGISTER.

RULES AND REGULATIONS

No data, views, or arguments having been received in response to the said notice, the following regulations, to become effective 30 days after publication in the FEDERAL REGISTER, are adopted to constitute a new part consisting of §§ 151.1 to 151.61:

BEFINTTIONS

Sec.		
151.1	Factory ship.	
151.2	Land station.	
151.3	Secondary processing land static	on.
151.4	Whale catcher.	

age	
	age

151.11 Applications for licenses.

CLOSED SEASONS

ships taking sperm whales. RECORDS AND REPORTS

151.30 Records to be maintained on whale catchers.

151.32 Records to be maintained at second-

ary processing land stations.
151.33 Report on employment, craft, and products of whaling operations.

151.34 Records retention period.

SALVAGE OF UNCLAIMED WHALES

151.40 No processing license required. 151.41 Reporting of salvage of dead whales required.

MOLESTING OR UNAUTHORIZED INTERFERENCE WITH WHALES

151.50 Molesting whales prohibited.

ment-officers.

INSPECTION AND ENFORCEMENT

151.60 Fish and Wildlife Service employees designated as enforcement officers. 151.61 State officers designated as enforce-

AUTHORITY: §§ 151.1 to 151.61 issued under Sec. 12, 64 Stat. 425; 16 U. S. C. 916j.

DEFINITIONS

The words § 151.1 Factory ship. "factory ship" mean a vessel in which or on which whales are treated or processed, whether wholly or in part.

Land station. "land station" mean a factory on the land at which whales are treated or processed, whether wholly or in part.

§ 151.3 Secondary processing land station. The words "secondary processing land station" mean a factory on the land which receives from a land station for further processing any or all of those parts of whales which are required, by paragraph 12 of the Schedule of the Whaling Convention of 1946, as amended (§ 351.12 of this title), to be processed by boiling or otherwise.

§ 151.4 Whale catcher. The words "whale catcher" mean a vessel used for the purpose of hunting, taking, towing, holding on to, or scouting for whales.

LICENSES

§ 151.10 Licenses required to engage in whaling. No person shall engage in the taking or processing of blue whales, fin whales, humpback whales, sei whales, minke whales, or sperm whales without first having obtained an appropriate ship or land station for processing, with license.

for licenses. § 151.11 Applications Applications for licenses to engage in the taking and processing of whales of the species listed in § 151.10 shall be submitted to the Director, Fish and Wildlife Service, Department of the Interior, Washington 25, D. C. Such application shall be accompanied by the affidavit or affidavits prescribed in section 6 (d) and (e) of the Whaling Convention Act of 1949 and by a check or United States Postal Money Order payable to the 'The record-keeping requirements con-United States Fish and Wildlife Service tained herein have been approved by the in the appropriate amount as prescribed Bureau of the Budget in accordance with the by the scale of license fees in section 6 Federal Reports Act of 1942. (b) of the Whaling Convention Act of 1949.

CLOSED SEASONS

§ 151.20 Whale catchers attached to land stations taking baleen whales. It is forbidden to use a whale catcher attached to a land station for the purpose of taking or killing blue whales, fin whales, humpback whales, sei whales or minke whales, except during the period May 1 to October 31 following, both days inclusive.

\$ 151.21 Whale catchers attached to land stations taking sperm whales. It is forbidden to use a whale catcher at-tached to a land station for the purpose of taking or killing sperm whales except during the period April 1 to November 30 following, both days inclusive.

§ 151.22 Whale catchers attached to factory ships taking sperm whales. It is forbidden to use a whale catcher attached to a factory ship for the purpose of taking or killing sperm whales except during the period April 1 to November 30 following, both days inclusive.

RECORDS AND REPORTS 1

§ 151.30 Records to be maintained on whale catchers. There shall be maintained on each whale catcher a suitable log book or other record in which shall be recorded the following information, and such record shall be available for inspection by any person authorized by law or by this part to act as an inspector or enforcement officer, who shall be permitted to abstract therefrom such information as may be needed by the United States Government:

(a) The date and hour of the killing or capture of each whale;

(b) The point in latitude and longitude where each whale is killed or captured;

(c) The species of each whale killed or captured; (d) The time of delivery of each whale

to the land station or factory ship; (e) Data specified under paragraphs (a), (b), and (c) of this section for each whale killed and later lost, or for some other reason not delivered to a factory an account of the circumstances surrounding such loss or nondelivery; and

(f) Any observations on migration of whales and on location of calving grounds.

§ 151.31 Records to be maintained on factory ships and at land stations. (a) There shall be maintained in duplicate on board each factory ship and at each land station a detailed record of all whales received and processed as follows:

^{151.20} Whale catchers attached to land stations taking baleen whales. 151.21 Whale catchers attached to land stations taking sperm whales.

151.22 Whale catchers attached to factory

^{151.31} Records to be maintained on factory ships and at land stations.

with number 1 on January 1 of each

year). (2) Species of the whale.

(3) Date and time killed and date and time received by the factory ship or land station.

(4) Sex of the whale.

(5) Length of the whale (length to be measured as specified in paragraph 9 (d) of the Schedule of the Whaling Convention of 1946, § 351.9 (d) of this title).

(6) Sex of embryo if present.(7) Length of embryo in feet and

inches. (8) A description of the stomach contents of the whale.

(9) Name of whale catcher which took the whale.

(10) Name of gunner who killed the whale.

(11) The exact location in which the whale was taken, stated in degrees and minutes of latitude and longitude.

(12) Under "Remarks" enter, if the whale is a female, whether lactating or milk-filled as well as abnormalities or peculiarities concerning the whale and the character and quantity of any portion of the whale transferred to a secondary processing plant

(b) Each sheet of such reports shall be verified or approved by a person authorized by law or by this part to act as inspector or enforcement officer, and the said duplicate reports for each calendar year shall be submitted to the Director of the Fish and Wildlife Service, Department of the Interior, Washington 25.

D. C., within 30 days after the end of each calendar year.

§ 151.32 Records to be maintained at secondary processing land stations. (a) There shall be maintained by all licensed secondary processing land stations receiving from land stations parts of whales for further processing a suitable ledger or book in which the following information shall be recorded, and such records shall be available for inspection by any authorized person:

(1) The kind and quantity of parts of

whales received.

(2) The date of receipt thereof.

(3) The kind and quantity of products

derived therefrom.

(b) Said ledger or book or certified true copies thereof shall be submitted in

(1) Serial number of the whale (begin | duplicate to the Director, Fish and Wildlife Service, Department of the Interior, Washington 25, D. C., within 30 days after the end of each calendar year,

8 151 33 Report employment. on craft, and products of whaling operations. The person or persons responsible for the operation of every factory ship, land station and secondary processing land station shall annually submit in duplicate to the Director, Fish and Wildlife Service, Department of the Interior, Washington 25, D. C., within 30 days after the end of each calendar year, a report on employment, craft and products, which shall show the number of persons employed, the nature of the task which each performs, and the manner in which each is remunerated; the number and type of vessels operated, including the net tonnage and horsepower of whale catchers and the gross tonnage and horsepower of other vessels; and the quantity and type of products manufactured, including semi-processed products delivered to secondary processing land stations. Such reports shall be subscribed and sworn to by the person or persons responsible for the operation of said factory ships, land station and secondary processing land station before a notary public or a person authorized by law or by this part to act as inspector or enforcement officer.

Records retention period. The records required to be maintained under the regulations in this part shall be retained by the person or persons re-sponsible for their preparation and maintenance for a period of six months following the end of the calendar year to which such records apply.

SALVACE OF UNCLAIMED WHALES.

§ 151.40 No processing license required. No license shall be required for the salvage and processing of any dead whale found upon a beach or stranded in shallow water, or of any unclaimed dead whale found floating at sea.

§ 151.41 Reporting of salvage of dead whales required. (a) Any person or persons salvaging and/or processing any dead whale of any of the species enumerated in § 151.10 shall submit a report

in writing to the Director, Fish and Wildlife Service, Department of the Interior, Washington 25, D. C.

(b) Such report shall show the date and exact locality in which such dead whale was found, its species and length, the disposition made of the whale, the firm utilizing or processing it, the products derived therefrom, and any other relevant facts.

MOLESTING OR UNAUTHORIZED INTERFERENCE WITH WHALES

§ 151.50 Molesting whales prohibited. The chasing, molesting, exciting, or interfering, with firearms or by any other manner or means, with any whale of the species listed in § 151.10 or of the species protected by the provisions of the International Convention for the Regulation of Whaling of 1946 is prohibited. Persons violating this section shall, upon arrest and conviction, be subject to the penalties imposed by the Whaling Convention Act of 1949.

INSPECTION AND ENFORCEMENT

§ 151.60 Fish and Wildlife Service employees designated as enforcement officers. Any employee of the Fish and Wildlife Service duly appointed and authorized to enforce Federal laws and regulations administered by the Department of the Interior and the Fish and Wildlife Service is authorized and empowered to act as a law enforcement officer for the purposes set forth in the Whaling Convention Act of 1949.

§ 151.61 State officers designated as enforcement officers. Any employee of a State government who has been duly designated by the Director of the Fish and Wildlife Service, with the consent of the State government concerned, is authorized and empowered to act as a Federal law enforcement officer for the purposes set forth in the Whaling Convention Act of 1949.

Issued at Washington, D. C., and dated April 12, 1956.

> DOUGLAS MCKAY, Secretary of the Interior.

[F. R. Doc. 56-2968; Filed, Apr. 17, 1956; 8: 46 a. m.l



Department of State

LATEST TRADE AND TARIFF AGREEMENT CONCLUDED:

The United States Government on May 23, 1956, signed at Geneva the Protocol embodying the results of the tariff negotiations begun on January 18. The negotiations were conducted under the auspices of the Contracting Parties to the General Agreement on Tariffs and Trade (GATT)

The analysis of results of the negotiations (including details of the individual concessions by commodity) completed by the United States will be released by the Department of State on June 7. A Presidential proclamation giving effect on June 30 to the concessions granted by the United States will be issued about the same time.

The opening of this protocol for signature formally marked the end of the

1956 Tariff Conference. The United States concluded negotiations with all the 21 other countries participating. These were Australia, Austria, Belgium, Canada, Chile, Cuba, Denmark, Dominican Republic, Finland, France, West Germany, Haiti, Italy, Luxembourg, Japan, The Netherlands, Norway, Peru, Sweden, Turkey, and the United Kingdom.

Harry M. Shooshan, International Activities Assistant, Technical Review Staff, represented the Department of the Interior at this tariff negotiating conference.

Note: Also see Commercial Fisheries Review, February 1956, p. 54.

1950, p. 54.



ACTION TAKEN TO HELP U. S. FISHING INDUSTRY:

The White House announced on June 4 a series of actions designed to benefit the United States fishing industry.

The new program, which is the result of several months of intensive study within the administration, will be implemented in two steps.

First, Department of the Interior officials will undertake immediately the necessary preliminary steps for the creation within the Department of a new bureau with sole responsibility for Federal programs related to the fisheries. The new bureau, which will be called the Bureau of Fisheries, will come into existence on July 1, and will take over administration of all fishery responsibilities now vested in the Fish and Wild-life Service,

Secondly, the administration will request Congress to enact into law a comprehensive commercial fisheries program which will provide a broad charter for the new agency. The administration bill, which in some respects is modelled after the so-called Saltonstall-Kennedy Act due to expire next year, would authorize the Secretary of the Interior to conduct needed investigations and research into all phases of fishing activities including oceanographic, biological,

statistical, and economic studies of the distribution and abundance of fishery resources, the development of new and improved methods of fishing, and the development of improved handling methods and techniques. In addition, the bill would authorize research into the nutritive value of fish and fishery products, and many other activities designed to promote the flow of fishery commodities in domestic and foreign commerce.

The provisions of the Saltonstall-Kennedy Act dealing with the transfer of certain funds from the Department of Agriculture under Section 32 of the Act of August 24, 1935 would be continued on a permanent basis and the present \$3,000,000 limitation on expenditure of these funds would be removed.

Finally, the administration proposal includes the establishment of a special \$10,000,000 revolving fund to be used to make loans for the maintenance, repair, and equipment of fishing vessels. Loans made from the fund will carry interest rates of not less than three percent and could be made for periods of up to ten years.

Implementation of these proposals will strengthen the Government's efforts to assist the fishing industry and underlines the administration's desire to give greater recognition to the vital role the United States fisheries play in the Nation's economy.



Eighty-Fourth Congress (Second Session)

Listed on the following page are public bills and resolutions that directly or



indirectly affect the fisheries and allied industries. Public bills and resolutions are shown when introduced; from month to month the more pertinent reports, hearings, or

chamber actions on the bills shown are published; and if passed, they are shown when signed by the President. COMMERCIAL FISHERIES EDUCATIONAL PROGRAM, \$2,2379 (Payne) passed the Senate on May 21, and was sent to the House where it was referred to the House Committee on Merchant Marine and Fisheries, \$2,2379 failed to pass in the House by not receiving the necessary two-thirds majority for a suspension passage,

The House on July 2 passed over without prejudice H. R. 10433 (similar to S. 2379), relative to training of fishing industry personnel. H. R. 10433 (amended), a bill to promote the fishing industry in the United States and its Territories by providing for training of needed personnel for such industry; introduced April 11 (McCormack), was favorably reported to the House on June 21 by the Committee on Merchant Marine and Fisheries (H. Rept. No. 2745); referred to the Committee of the Whole House on the State of the Union,

Introduced in the House May 28, H, R, 11479 (Hale), a bill to promote the fishing industry in the United States and its Territories by providing for the training of needed personnel for such industry; to the Committee on Merchant Marine and Fisheries (similar to H, R, 10433).

COMMERCIAL FISHERIES POLICY: S, 4021 (Payne) introduced in the Senate June 11, 1956; a bill to encourage the development, marketing, and distribution of domestic fishery resources of the United States, and for other purposes; to the Committee on Interstate and Foreign Commerce, (This bill implements the action taken by the White House on June 4 to help the United States Fishing Industry and proposed legislation announced on June 8 by Assistant Secretary of the Interior D'Ewart.)

Also, H. R. 11804 (McIntire) introduced in the House June 18, $\overline{1956}$; similar to S. $\underline{4021}$; to the Committee on Merchant Marine and Fisheries.

COMMERCIAL FISHERIES NATIONAL POLICY AND FISHERIES COMMISSION: Senate passed on May 24 with amendment §, 3275, to establish a sound and comprehensive national policy with regard to fisheries resources, after adopting committee amendment (in nature of a substitute), which had first been amended by Magnuson amendment transferring from Secretary of the Interior to Fisheries Division of Interior Department, functions relating to protection of seals and whales, (See Commercial Fisheries Review, June 1956, p. 87.)

Committee on Interstate and Foreign Commerce reported to the House on July 2, H. R. 9552, to create and prescribe the functions of the United States Fisheries Commission (H. Rept. 2548).

Introduced in the House May 21, H., R. 11342 (King of Calif.), and H. R. 11343 (Wilson of Calif.), similar bills to establish a sound and comprehensive national policy with respect to the fisheries; to strengthen the fisheries segment of the national economy; to establish within the Department of the Interior a Fisheries Division; to create and prescribe the functions of the United States Fisheries Commission; and for other purposes. Also introduced May 23, H. R. 11415 (Nicholson); introduced May 28; H. R. 11502 (Tollefson); all referred to the House Committee on Merchant Marine and Fisheries, all similar to H. R. 11342 and H. R. 11343, and related to amended S. 3275 passed by Senate May 24.

COMMERCIAL FISHERIES NATIONAL POLICY AND UNDERSECRETARY FOR FISHERIES AND WILDLIFE: H. R. 11570 (Bonner) introduced in the House June 4, 1956,

a bill to establish a sound and comprehensive national policy with respect to fisheries and wildlife; to strengthen the fisheries and wildlife segments of the national economy; to create and establish within the Department of the Interior the office of Undersecretary of Fisheries and Wildlife; a Fisheries Service and a Wildlife Service; and for other purposes; to the Committee on Merchant Marine and Fisheries,

H, R, 11570 (amended) was reported on June 18 favorably to the full House Committee on Merchant Marine and Fisheries by the Subcommittee on Fisheries and Wildlife Conservation. Reported favorably to the House by the Committee on Merchant Marine and Fisheries on June 28 (H. Rept. 2519), and referred to the Committee of the Whole House on the State of the Union. The bill as amended would provide for the following: (1) elevate the U.S. Fish and Wildlife Service to sub-cabinet level under an Assistant Secretary for Fish and Wildlife; (2) the Fish and Wildlife Service to be headed by a single administrator with the title of Commissioner and consist of two Bureaus within the Service, a Bureau of Commercial Fisheries and a Bureau of Wildlife, each administered by an individual director: (3) put marine mammals and such inseparable operations as Federal Aid, River Basin Studies, and game law enforcement in with Sport Fisheries and Wildlife administrative and fiscal functions would not be divided as proposed in many other bills pending before Congress): (4) removal of the limitation on the use of annual receipts now provided under the Saltonstall-Kennedy Act of 1954, so that approximately \$5 million would be available each year to the Commercial Fishing Industry for authorized activities: (5) establish a revolving loan fund of \$10 million for commercial fishermen for operation, maintenance, repair, and replacement of equipment of fishing gear and vessels, and for research into the basic problems of fisheries.

House Report No. 2519, Establishing a Sound and Comprehensive Policy with Respect to Fisheries and Wildlife (June 28, 1956, 84th Congress, 2nd Session), to accompany H. R. 11570, 7 pp., printed, Committee on Merchant Marine and Fisheries. Shows the committee amendments and explains the purpose of the bill.

DEFENSE PRODUCTION ACT OF 1950: President signed June 2, 1956, H. R. 9852, extending until June 30, 1958, provisions of Defense Production Act of 1950 (P. L. 632).

DISTRICT OF COLUMBIA FISH AND GAME LAWS: \$, 3882 (Beall) introduced in the Senate May 18; a bill to revise and modernize the fish and game laws of the District of Columbia, and other purposes, Section 3 of the bill provides that striped bass or rockfish under 12 inches in length, measured from the tip of the nose to the tip of the tail, shall not be offered for sale in the District. Also, H. R. 11250 (Hyde) introduced in the House May 16, similar to \$5, 3883 (Beall); both bills referred to the Committee on the District of Columbia in each chamber.

FISH HATCHERIES: H. R. 221 (Wickersham) introduced in the first session (Jan, 5, 1956), a bill to establish rearing ponds and a fish hatchery in western Oklahoma, with amendment was reported to the House on June 7, 1956, by the House Committee on Merchant Martine and Fisheries and referred to the Committee of the Whole House on the State of the Union (H, Rept. 2269), Passed over by the House without prejudice on June 18 and July 2,

H. R. 8810, to provide for the establishment of a new fish hatchery atMiles City, Mont.; passed by the Senate on May 21, 1956, without amendment and cleared for the President. Signed by the President on June 4, (P. L. 565).

H. R. 11548 (Poff) introduced in the House May 31, 1956; a bill to provide for the establishment of a new fish hatchery in the vicinity of Point Bank, Va.; to the Committee on Merchant Marine and Fisheries.

S. 3998 (Aiken) introduced in the Senate June 5, 1956; a bill to provide for the development of the Federal Fish hatchery, known as the Holden trout hatchery, at Pittsford, Vt.; to the Committee on Interstate and Foreign Commerce, Reported favorably to the Senate by the Committee on June 21, 1956. Passed without amendment by the Senate on July 2 and cleared for the House,

H. R. 9822 (Ervin), to provide for the establishment of a new fish hatchery in North Carolina, was signed by the President June 18, 1956 (P. L. 596), Passed by the Senate on June 4, 1956, without amendment. Favorably reported to the Senate on May 23 by the Senate Committee on Interstate and Foreign Commerce (S, Rept, 2038).

FISHERIES DIVISION IN DEPARTMENT OF INTERIOR: Introduced in the House May 21, H. R. 11324 (Bates), a bill to establish a sound and comprehensive national policy with respect to the development, conservation for preservation, management, and use of fisheries resources, to create and prescribe the functions of the United States Fisheries Division of the Department of the Interior, and for other purposes; to the Committee on Merchant Marine and Fisheries, Similar and related to \$.3694.

GREAT LAKES NAVIGATION RULES; H. R. 12095 (Bonner), introduced in the House on July 3, a bill to clarify the application of navigation rules for the Great Lakes and their connecting and tributary waters and for other purposes; to the Committee on Merchant Marine and Fisheries,

NSECTICIDES EFFECTS STUDY UPON FISH AND WILD-LIFE: H. R. 11839 (Metcall) introduced in the House June 19; a bill to authorize and direct the Secretary of the Interior to undertake continuing studies of the effects of insecticides, herbicides, and fungicides upon fish and wildlife for the purposes of preventing losses of those invaluable natural resources following spraying, and to provide basic data on the various chemical controls so that forests, croplands, and marshes can be sprayed with minimum losses of fish and wildlife; to the Committee on Merchant Marine and Fisheries.

NTERIOR DEPARTMENT APPROPRIATIONS: Conferees, in executive session, agreed to file a conference report on the differences between the Senate and House-passed versions of H. R. 9390, fiscal 1987 appropriations for Interior Department and related agencies (including the Fish and Wildlife Service). House adopted the conference report on H. R. 9390 on June 4 and sent the bill to the Senate, Senate adopted conference report on H. R. 9390, clearing the bill for the White House. The bill provides \$5,105,000 to the Fish and Wildlife Service for the Investigations of Resources (including the Branches of Commercial Fisheries, Fishery Biology, and Wildlife Research).

SEA NETTLES AND JELLYFSH RESEARCH: S. 3955 (Buller) Introduced in the Senate May 29, 1956, a bill to authorize research by the Fish and Wildlife Service to determine methods of, and to provide for grants to the states to assist approved research or other projects for, control or

extermination of sea nettles and jellyfish in Marine waters of the United States; to the Committee on Interstate and Foreign Commerce, H. R. 11627 (Miller) introduced in the House June 6, 1956; similar to 5, 3955,

WATER POLLUTION: S. 890, a bill to extend and strengthen the Water Pollution Control Act. House adopted conference report and cleared the bill for the White House on June 27, 1956.

H. R. 9540, a new bill, was passed by the House June 13 and sent to conference as a House amendment to S. 890.

WALRUSES: S. 3778 an act to amend the act for the protection of walruses, passed by Senate.

H. R. 10412 amending the act for the protection of walruses, reported out of Committee to the House on June 12 (H. Rept. 2333). S. 3778 (in lieu of H. R. 10412), a bill to amend the act for the protection of walruses; passed by the House June 18, 1956 and cleared for the White House.

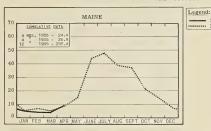
Signed by the President June 29, 1956 (P. L. 625). The amendment to the Act permits the taking of one bull walrus per year by a duly licensed non-native hunter under certain conditions. Also establishes nonresident and nonnative license fees and provides other protective regulations,

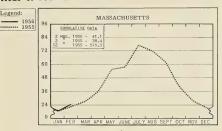
COMMERCIAL FISHERIES NATIONAL POLICY: Establishment of a National Policy for Commercial Fisheries (Hearings before the Subcommittee on Fisheries and Wildlife Conservation of the Committee on Merchant Marine and Fisheries, House of Representatives, Eighty-Fourth Congress, Second Session on: H. R. 8001 and identical bills to establish a national policy with respect to commercial fisheries; to establish the office of Assistant Secretary of Commerce for Commercial Fisheries, and define his functions, powers, and responsibilities; to strengthen the commercial fisheries segment of the national economy, and for other purposes. H. R. 9552 and identical bills to establish a sound and comprehensive national policy with respect to the development, conservation for preservation, management and use of fisheries resources, to create and prescribe the functions of the United States Fisheries Commission, and for other purposes, H. R. 10813 and identical bills to establish a sound and comprehensive national policy with respect to the fisheries; to create and prescribe the functions of the United States Fisheries Commission; to strengthen the fisheries segment of the national economy, and for other purposes. H, R, 11309 and identical bills to establish a sound and comprehensive national policy with respect to fisheries; to strengthen the fisheries segment of the national economy; to establish within the Department of the Interior a Fisheries Division; to create and prescribe the functions of the United States Fisheries Commission: and for other purposes. H. R. 11570 to establish a sound and comprehensive national policy with respect to fisheries and wildlife: to strengthen the fisheries and wildlife segments of the national economy; to create and establish within the Department of the Interior the Office of Undersecretary of Fisheries and Wildlife, a Fisheries Service and a Wildlife Service; and for other purposes. May 10, 21, 22, and June 8, 1956), 253 pp., printed. Presents the statements of the witnesses appearing before the Committee; information supplied the Committee by various individuals, Congressmen, and organizations; reports from Federal Departments; and the texts of the various bills.

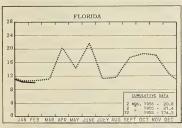




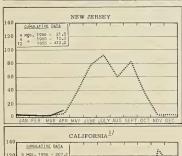
CHART I - FISHERY LANDINGS for SELECTED STATES In Millions of Pounds

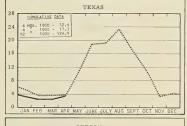












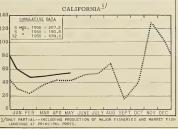
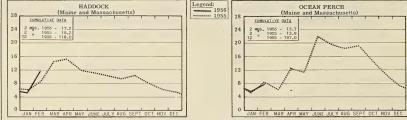


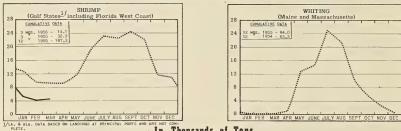


CHART 2 - LANDINGS for SELECTED FISHERIES

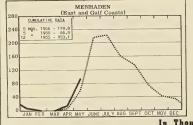


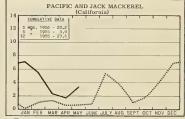


In Millions of Pounds

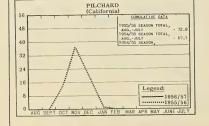


In Thousands of Tons





In Thousands of Tons



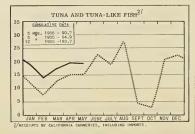
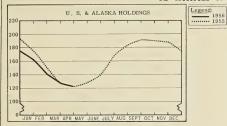


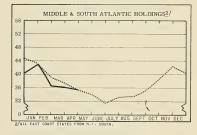
CHART 3 - COLD-STORAGE HOLDINGS and FREEZINGS of FISHERY PRODUCTS *

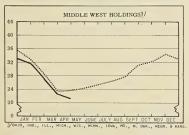
In Millions of Pounds

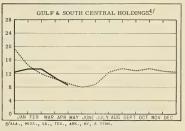


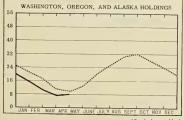


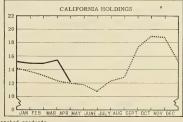








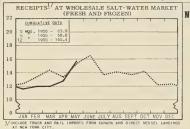




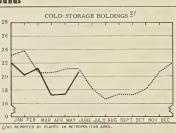
*Excludes salted, cured, and smoked products

CHART 4 - RECEIPTS and COLD-STORAGE HOLDINGS of FISHERY PRODUCTS at PRINCIPAL DISTRIBUTION CENTERS



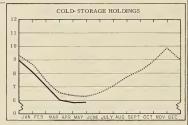


NEW YORK CITY



RECEIPTS AT WHOLESALE MARKET (FRESH AND FROZEN) IAN FEB MAR APR MAY JUNE JULY AUG SEPT OF

CHICAGO



SEATTLE



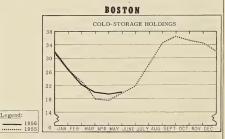
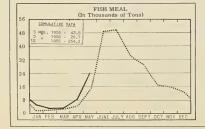


CHART 5 - FISH MEAL and OIL PRODUCTION - U.S and ALASKA

Legend:



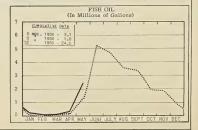
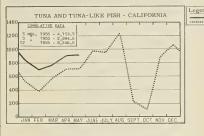
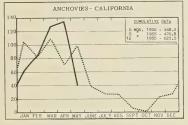


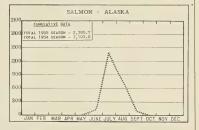
CHART 6 - CANNED PACKS of SELECTED FISHERY PRODUCTS

In Thousands of Standard Cases



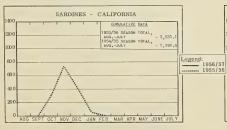






400	SARDINES (ESTIMATED) - MAINE
1200	12 Mgs. 1955 - 1,264.8 12 1954 - 2,934.9
000	
800	
600	
400	
200	

STANDARD CASES									
Variety	No. Cans	Can Designation	Net 1	Vgt.					
SARDINES	100	1 drawn	31/4	oz,					
SHRIMP	48		5	OZ.					
TUNA	48	No. ½ tuna	6 & 7	oz.					
PILCHARDS	48	No. 1 oval	15	oz,					
SALMON	48	1-pound tall	16	oz.					
ANCHOVIES	48	1/2 lb.	8	oz.					



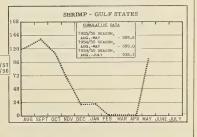
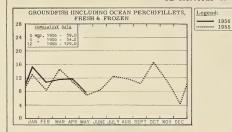
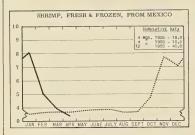


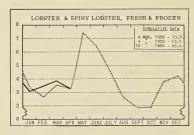
CHART 7 - U.S. FISHERY PRODUCTS IMPORTS

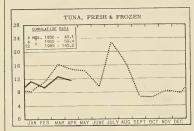
In Millions of Pounds



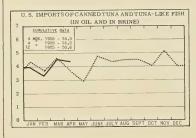


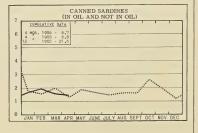














FISH AND WILDLIFE SERVICE PUBLICATIONS

THESE PROCESSED PUBLICATIONS ARE AVAILABLE FREE FROM THE DIVISION OF INFORMATION, U. S. FISH AND WILDLIFE SERV-ICE, WASHINGTON 25, D. C. TYPES OF PUBLICATIONS ARE DESIGNATED AS FOLLOWS:

- CURRENT FISHERY STATISTICS OF THE UNITED STATES AND ALASKA

AND ALASKA.
FISHERY LEAFLETS.
STATISTICAL SECTION LISTS OF DEALERS IN AND PRODUCTS OF FISHERY PRODUCTS AND BYPRODUCTS,
MARKET DEVELOPMENT LISTS.
SEPARATES (REPRINTS) FROM COMMERCIAL FISHERIES

REVIEW.

Number <u>Title</u> CFS-1276 - Frozen Fish Report, Annual 1955, 14 pp.

CFS-1283 - Texas Landings, Jan. 1956, 3 pp. CFS-1291 - Frozen Fish Report, Feb. 1956, 8 pp.

CFS-1293 - New York Landings, Jan. 1956, 4 pp. CFS-1294 - Florida Landings, Dec. 1955, 6 pp. CFS-1301 - Mississippi Landings, Jan. 1956, 2 pp.

CFS-1302 - California Landings, Dec. 1955, 4 pp. CFS-1303 - New Jersey Landings, Feb. 1956, 3 pp. CFS-1304 - Texas Landings, Feb. 1956, 3 pp.

CFS-1306 - Frozen Fish Report, Mar. 1956, 8 pp. CFS-1307 - Fish Stick Report, Jan. -Mar. 1956, 2pp.

CFS-1308 - North Carolina Landings, Feb. 1956 CFS-1310 - Mississippi Landings, Feb. 1956, 2 pp.

CFS-1315 - Rhode Island Landings, Feb. 1956, 3 pp. CFS-1319 - Maine Landings, Feb. 1956, 3 pp. CFS-1320 - Alabama Landings, Feb. 1956, 2 pp.

CFS-1321 - Chesapeake Fisheries, 1954 Annual Summary, 8 pp

CFS-1322 - Ohio Landings, Mar. 1956, 2 pp. CFS-1332 - Shrimp Landings, Mar. 1956, 4 pp. CFS-1334 - Maine Landings, Mar. 1956, 3 pp.

WHOLESALE DEALERS IN FISHERY PRODUCTS: SL - 3 - Massachusetts, 1955 (revised), 9 pp. SL - 16 - Florida, 1955 (revised), 9 pp.

FIRMS CANNING FISHERY PRODUCTS: SL -102A - Pacific Sardines, 1955, 1 p. SL -102 - Maine Sardines, 1955 (including sea

herring), 1 p.
- Tuna and Tunalike Fishes, 1955, 2 pp.

SL -103 SL -104 - Mackerel, 1955, 1 p

SL -105 - Alewives and Alewife Roe, 1955, 1 p.

SL -108 - Salmon Eggs for Bait, 1955, 1 p.

SL -112 - Shrimp, 1955, 2 pp. SL -117 - Pacific Sea Herring, 1955, 1 p.

-Squid, 1955, 1 p. SL -119 SL -120 - Anchovies, 1955, 1 p.

FL -336bb - Commercial Fisheries Outlook,

Apr. -June 1956, 40 pp FL -393 - Fisheries of the United States &

Alaska, 1955 (revised), 3 pp.

MARKET DEVELOPMENT LISTS (REVISED): MDL-11 - New Hampshire Locker Plants, May

MDL-15 - Mississippi Locker Plants, Mar. 1956, 3 pp

MDL-32 - New Mexico Locker Plants, May 1956, 3 pp.

MDL-47 - Wyoming Locker Plants, May 1956, 3 pp. MDL-53 - Nevada Locker Plants, May 1956, 1 p.

Sep. No. 438 - Technological Studies on the Processing of Sea Lions.

Sep. No. 439 - Iron Sulfide Discoloration of Tuna Cans, No. 3 - Effect of Variables Introduced by the Fish.

Sep. No. 440 - Research in Service Laboratories (June 1956): Contains these short articles -- "Fish Oils in Sprays for Citrus Trees," "Alaska Shrimp Waste has Possibilities as Hatchery Food, "Tech. Note. No. 33 - Reduction of Dehydration in Frozen Fish-Fillet Blocks," "Interim Federal Specifications for Canned Sardines.

THE FOLLOWING SERVICE PUBLICATIONS ARE AVAILABLE ONLY FROM THE SPECIFIC OFFICE MENTIONED.

Gulf Monthly Landings, Production, and Shipments
of Fishery Products, March 1956, 5 pp. (Market
News Service, U. S. Fish and Wildlife Service, 609-611 Federal Bldg., New Orleans 12, La.) Gulf States shrimp, oyster, finfish, and blue crab landings; crab meat production; LCL express shipments from New Orleans; and wholesale prices of fish and shellfish on the New Orleans French Market; for the month indicated.

Boston Fishery Products Monthly Summary, March 1956, 16 pp. Boston Fishery Products Monthly Summary, April 1956, 16 pp. (Market News Service, U. S. Fish and Wildlife Service, 10 Commonwealth Pier, Boston 10, Mass.) Landings and ex-vessel prices for fares landed at the Boston Fish Pier and sold through the New England Fish Exchange; and Boston frozen fishery products prices to primary wholesalers; for the months indicated.

(New York) Monthly Summary, February 1956, Receipts of Fishery Products at the New York City Wholesale Salt-Water Market, 4 pp. Monthly Summary-March 1956, Receipts of Fishery Products Market, 4 pp. (Market New Service, U. S. Fish and Wildlife Service, 155 John St., New York 38, N. Y.) Receipts in the salt-water section of the Fulton Fish Market by species and by states and provinces for the month indicated

California Fishery Products Monthly Summary,

March 1956, 10 pp. Market News Service, U. S.

Fish and Wildlife Service, Post Office Bldg., San Pedro, Calif. California cannery receipts of raw tuna and tunalike fish, herring, and squid; pack of canned tuna, mackerel, herring, anchovies, and squid; market fish receipts at San Pedro, Santa Monica, Eureka, and San Diego areas; United States imports of fishery products into California and Arizona; cold-storage freezings and holdings of fishery products; canned fish and frozen shrimp prices at the primary or wholesale level; for the month indicated.

- Monthly Summary of Fishery Products Production in Sefected Areas of Virginia, North Carolina, and Maryland, April 1956, 4 pp. (Market News Service, U. S. Fish and Widdlife Service, 18 S. King St., Hampton, Va.) Fisheries production for the Virginia areas of Hampton Roads, Lower Northern Neck, and Eastern Shore; the Maryland areas of Crisfield, Cambridge, and Ocean City; and the North Carolina areas of Atlantic, Beaufort, and Morehead City; together with cumulative and comparative data; for the month indicated.
- (Chicago) March 1956 Monthly Summary of Chicago's Fresh and Frozen Fishery Products
 Receipts and Wholesale Prices, 10 pp., (Market News Service, U. S. Fish and Wildlife Service, 565 W. Washington St., Chicago 6, Ill.) Receipts at Chicago by species and by states and provinces; fresh-water fish, shrimp, and frozen fillet wholesale market prices; for the month indicated.
- (Seattle) Monthly Summary of Fishery Products, April 1956, 4 pp. (Market News Service, U. S. Fish and Wildlife Service, 421 Bell St. Terminal, Seattle 1, Wash.) Includes landings and local receipts as reported by Seattle and Astoria (Oregon) wholesale dealers.
- "Mortality of Olympia Oysters at Low Témperatures," by Harry C. Davis, 3 pp., printed. (Reprinted from Biological Bulletin, vol. 109, no. 3, December 1955, pp. 404-406.) (Available free from the Fishery Biological Laboratory, U. S. Fish and Wildlife Service, Milford, Conn.)
- Open Letter to All Aku Fishermen, 6 pp., illus., processed. (Available free from Pacific Oceanic Fishery Investigations, P.O. Box 3830, Honolulu, Hawaii.)

MISCELLANEOUS PUBLICATIONS

THESE PUBLICATIONS AGE NOT AVAILABLE FROM THE FISH AND WILLDIFE SERVICE, BUT SUBLILLY MAY BE COTAINED FROM THE OR-GANIZATION ISSUING THEM. CORRESPONDENCE REGARDING PUBLICATIONS THAT FOLLOW SHOULD BE ADDRESSED TO THE RESPE

- "Age Composition of the Southern California Catch of Pacific Mackerel for the 1954/55 Season," by John E. Fitch, article, California Fish and Game, vol. 42, no. 2, April 1956, pp. 143-148, printed. California Department of Fish and Game, 926 J St., Sacramento 14, Calif.
- Aktuelle Fryseritekniske Spørsmål (Topical Refrigeration Problems), articles, Fiskeridirektoratet Skrifter, 1954, Serie Teknologiske Undersokelser, vol. 2, no. 15, 1954, 149 pp., illus., printed in Norwegian.
- (Alabama) Department of Conservation, Report for Fiscal Year October 1, 1954, September 30, 1955,

232 pp., illus., printed. Department of Conservation, Montgomery 4, Ala., 1956. Presents the annual reports of the Alabama Department of Conservation for the fiscal year October 1, 1954, through September 30, 1955. Among these are reports from the Fish Management Section and Fisheries Research Section of the Department's Division of Game and Fish. The primary objective of the Fish Management Section is to apply fish management techniques in such a way as to obtain the highest possible production and harvest of fish from the inland fresh waters of the State. In the Fisheries Research Section, work was continued at Auburn upon fish parasites, the toxicity of various chemicals to fish and fish food organisms, pond weed control, the effect of herbicides upon fish production, and other phases of pond and lake management. The Division of Seafoods reports on the shrimp, clam, and oyster research programs, shrimp and oyster production, and other activities.

- (Alaska) 1954 Annual Report, Report No. 6, 92 pp., illus., printed. Alaska Fisheries Board and Alaska Department of Fisheries, Juneau, Alaska, 1956. Summarizes the activities of the Alaska Fisheries Board and the Alaska Department of Fisheries for 1954. The work of the Biological Research Division was centered on the investigations of the troll salmon fishery of Southeastern Alaska, the salmon runs of the Taku River, the black cod fishery, the Kodiak king crab, and with continued construction and improvement of facilities at the Kitoi Bay Research Station. The king crab investigation has already paid dividends in pointing the way toward proper management of this new industry. Also describes the inspection, predator control, sport fish, and watershed management programs. The statistical part of the report contains data on the value of canned salmon by species (1945-54); number of canneries and the salmon pack (1945-54); salmon catch by gear, species, and districts, 1954; quantity and value of Alaska fisheries landings (1945-54); and quantity and value of Alaska fisheries products as prepared for market (1945-54). In addition to a financial state ment, the report concludes with a discussion of the plans of the Department and its future outlook.
 - Annual Report of the Fisheries Research Board of Canada for the Year 1954, 187 pp., printed (Introduction is in English and French and balance of report in English). Fisheries Research Board of Canada, Ottawa, Canada, 1954. Full reports are presented of the work for 1954 of the biological and experimental stations of the Fisheries Research Board of Canada. The work of the Board is organized in three closely coordinated fields: Biological, technological, and oceanographic. During 1954 much effort was also expended in the field of industrial development. Stations for the study of the biology of fish are maintained at St. Andrews, N. B.; St. John's, Newfoundland; Winnipeg, Manitoba; and Nanaimo, B. C. Biological investigations in the Eastern Arctic are carried out from headquarters on the McGill University Campus, Montreal, P. Q. For greater convenience in covering the great distances involved these principal stations maintain field stations at appropriate places and port observers at the major fishing centers.

The workers at these stations are concerned with the stocks of fish as they occur in the ocean or fresh water; finding out how many are caught, where and when they are caught, and how much effort was expended in catching them. Also studied are the rates of growth of populations of fish, their age at maturity, their fecundity, and their mortality, all with a view to determining the level of fishing effort which will exploit the fish populations most efficiently and profitably. Technological stations are situated at Halifax, N. S.; Grand River, P. Q.; and Vancouver, B. C. A technological unit comprised primarily of engineering services is stationed at St. John's, Newfoundland. Workers at these stations devote their attention to the fish from the time they are taken out of the water until they are purchased by the consumer. Experiments are carried out to improve methods in handling, preserving, processing and transporting fish, and in making useful products out of fish waste. Oceanographic work continues to be carried on from the coastal biological stations. A list of the publications and reports that were published in 1954 by the Board is included.

- "The Atlantis Marine Geological Expedition to Peru and Chile," by Dr. Parker D. Trask, article, Nature, vol. 177, no. 4506, March 10, 1956, pp. 454-455, printed, single copy 2s. (28 U. S. cents). Macmillan & Co., Ltd., St. Martin's St., London, W. C. 2, England. Describes an expedition conducted under the auspices of Woods Hole Oceanographic Institution. The research vessel Atlantis was used to explore the deep trenches that lie off the coast of Peru and northern Chile during November and December 1955. The primary objective of the expedition was to study the sediments.
- Bulletin of the Japanese Society of Scientific Fisheries, vol. 20, 1954, printed in Japanese with summaries in English. Japanese Society of Scientific Fisheries, Tokyo, Japan. Contains among others the following articles: "Experiment on the Antisepsis of Foods by Radioactive Rays. Preliminary Report--Preservation of Foods by Gamma-Radiation," and Parts I and II--"Studies on the Concentration of Liver Oils. Application of Paper Chromatography for Selecting Solvent."
- Bulletin of the Japanese Society of Scientific Fisheries, vol. 20, 1955, illus., printed in Japanese with summaries in English. Japanese Society of Scientific Fisheries, Tokyo, Japan. Contains among others the following articles: Parts II, III, IV, and V--"Experiment on the Antisepsis of Foods by Radioactive Rays. Preservation of Foods by Gamma-Radiation:" "On the Relation between Height of Drying Position of Fish and Number of Attached Flies;" and "Studies on the Economical Manufacture of Vitamin A Concentrate from Fish Liver Oil. VI. Esterification of Vitamin A Concentrate. Acetylation and Palmitylation with Acid Chloride."
- Bulletin of the Japanese Society of Scientific Fisheries, vol. 21, 1955, printed in Japanese with summaries in English. Japanese Society of

Scientific Fisheries, Tokyo, Japan. Contains among others the following articles: Parts I and II--"Studies on Utilization of Fish-Wastes. On Preservation with Cereals, their Offals, and Sawdust."

- Bulletin Officiel D'Information du Conseil Superieur de la Peche (Official Information Bulletin of the Supreme Fishery Council), Number 23, January-February-March 1956, 71 pp., illus, printed in French. Conseil Superieur de la Peche, 1 Avenue de Lowendal, Paris, France.
- (Canada) Department of Fisheries Twenty-Fifth Annual Report, 1954-1955, 79 pp., printed. Department of Fisheries, Ottawa, Canada. This is the 88th Annual Fisheries Report of the Government of Canada. Discusses the conservation and development service; inspection and consumer service; markets and economics service; information and educational service; industrial development service; Fishermen's Indemnity Plan; Fisheries Prices Support Board; Fisheries Research Board; international commissions; and special committees. A section of the report is devoted to a review (with statistics) of Canada's fishing industry during 1954. An appendix presents the financial statements of the Department's various activities for 1954-55.
- (Canada) Journal of the Fisheries Research Board of Canada, vol. 13, no. 2, March 1956, pp. 147-272, illus., printed. Fisheries Research Board of Canada, Ottawa, Canada. Contains, among others, the following articles: "Jellied Condition in the American Plaice, Hippoglossoides platessoides (Fabricius)," by Wilfred Templeman and Gertrude L. Andrews; "Spoilage of Fish in the Vessels at Sea: 3. The Value of Nitrite Loe and Nitrite Dips for the Preservation of Gutted Fish in the Hold of the Vessel," by C. H. Castell and G. K. Gunnarsson; "Atlantic Salmon Tagged in East Coast Newfoundland Waters at Bonavista," by A. A. Blair; and "Effects of Temperature, Salinity and Oxygen on the Survival of the American Lobster," by D. W. McLeese.
- (Canada) Preliminary Annual Report of the Maritime Fisheries, 1955, 43 pp., processed, in French and English. Quebec Bureau of Statistics, Department of Trade and Commerce, Quebec, Canada. Statistics show quantity and value of fish caught in the Province of Quebec during 1955, 1954, and 1953, by species, counties, and landing points; and catch and disposition of the principal species of fish.
- (Ceylon) Progress Reports, Biological and Technological, No. 1, 23 pp., illus., printed. Fisheries Research Station, Department of Fisheries, Colombo, Ceylon, July 1955. Includes the
 following articles: "An Investigation into the
 Keeping Qualities of Ungutted Fish from the
 Trawlers," by A. W. Lantz and L. D. Gunasekers; "Preservation of Fish," by A. W. Lantz
 and C. Gunasekera; "Fishery By-products-Liquid Fish Meal," by A. W. Lantz and C. Gunasekera; "Study of Wadge Bank Trawl Fishery,"
 by S. Sivalingam and J. C. Medocf; "Ceylon
 Moss--A Marine Source," by M. Durairatham

- and J. C. Medcof; and "Ceylon's Beach Seine Fishery," by P. Canagaratnam and J. C. Medcof.
- Commercial Utilization of Dolphins (Porpoises) in Ceylon, by A. W. Lantz and C. Gunasekera, Bulletin No. 3, 14 pp., illus., printed. Department of Fisheries, Colombo, Ceylon.
- (Delaware) Annual Report of the Delaware Commission of Shell Fisheries of the State of Delaware for the Fiscal Year July 1, 1984 to June 30, 1955, 7 pp., processed. The Delaware Commission of Shell Fisheries, Dover, Del., 1955. Short description of oyster industry.
- <u>Die DLG-Leistungsprufung fur Fischwaren, 1954</u> (The DLG Performance Test for Fishery Products, 1954), by W. Ludorff, article, <u>Dtsch. Lebensmitt</u>, <u>-Rdsch.</u>, vol. 51, 1955, pp. 154-158, printed.
- Directory of Public Refrigerated Warehouses, 1956, 148 pp., illus., printed. National Association of Refrigerated Warehouses, Tower Bldg., Washington 5, D. C. Contains complete up-to-date listings of the organization, services, and facilities of all NARW member companies (specializing in the safe storage of perishable commodities requiring freezer or cooler service) operating throughout the United States, its possessions, and various foreign countries.
- East African Marine Fisheries Research Organization Annual Report, 1954-1955, 92 pp., illus., printed. Government Printer, Nairobi, Kenya, 1955. This report covers all of 1954 and from January 1-June 30, 1955. It describes the Organization's scientific investigations of the economically-valuable fishes of East African waters and fishing methods.
- "Exploring Davy Jones's Locker with Calypso," by Capt. Jacques-Yves Cousteau, article, The National Geographic Magazine, vol. CIX, no. 2, February 1956, pp. 149-161, illus., printed, single copy 75 cents. National Geographic Society, Washington 6, D. C. Describes an expedition of the ocean research vessel, Calypso, in which tests were made with a new camera designed by Dr. Harold E. Edgerton to take the world's first photographs under the Indian Ocean and Red Sea.
- "Fisheries and Naval Architecture," by Jan-Olof Traung, article, FAO Fisheries Bulletin, vol. VIII, no. 4, October-December 1955, pp. 167-197, illus., printed. Food and Agriculture Organization of the United Nations, Rome, Italy. A discussion of fisheries and naval architecture with chapters on (1) models; (2) the fisheries naval architect; (3) naval architects need to go fishing; (4) approach to the work; (5) boats will always be improved; (6) the dilemma of speed; (7) hull shape; (3) importance of sharp entrance; (9) block co-efficient; (10) prismatic co-efficient; (11) shape of the aft body; (12) importance of sharp propeller posts; (13) scope for improvement; (14) sea-kindliness; (15) propellers; (16) selection of engines; (17) hull construction; (18) work to be done; and (19) increased recognition of naval architecture in fisheries.

- Fishes of Japan, by Yaichiro Okada, 462 pp., illus., printed, \$10. Maruzen Co., Ltd., Tokyo, Japan, 1955. Describes and illustrates 391 species of fish which inhabit the waters in and around Japan. Gives information on the distribution, ecology, life history, method of capture, and utilization of the various species. Also includes a list of the scientific, Japanese, and English names of the fish.
- "Fish Meals as Amino Acid Sources in Chick Rations," by C. R. Grau and M. A. Williams, article, Poultry Science, vol. 34, 1955, pp. 810-817, printed. Poultry Science, Kansas State College, Manhattan, Kansas.
- "Fishing Vessels and the Principle of Innocent Passage," by Charles B. Selak, Jr., article American Journal of International Law, vol. 48, no. 4, October 1954, pp. 627-635, printed, single copy \$2. The American Journal of International Law, 1826 Jefferson Pl. NW., Washington 6, D. C.
- Fourteenth Annual Report of the Atlantic States

 Marine Fisheries Commission (to the Congress of the United States and to the Governors and Legislators of the Fifteen Compacting States), 62 pp., printed. Atlantic States Marine Fisheries Commission, 22 West First St., Mount Vernon, N. Y., April 1956. In this annual report the Commission reports progress on fishery research projects initiated and carried on by the Commission and on its behalf by the U.S. Fish and Wildlife Service, Under the North Atlantic Section of the report are included discussions of projects dealing with lobsters, haddock, clams, freezing fish in the round at sea, rebuilding the Service's Woods Hole Laboratory, ocean perch, cooperative striped bass program, shad, yellowtail flounder, exploratory fishing, catch statistics, fishery college in Massachusetts, Atlantic salmon, sea scallops, dams in the Connecticut River, dragging operations, industrial fishing (formerly called "trash" fishing), whiting, Maine herring, fluke, technological program under Saltonstall-Kennedy Act, and the need for improving technological facilities. Under the Middle Atlantic Section there is a discussion of projects dealing with shad, Delaware River anadromous fisheries management program, gray sea trout (weakfish), cooperative striped bass program, catch statistics, fluke, offshore ocean fisheries and waste disposal problems, sea scallops, dragging operations, sportfish surveys, yellowtail flounder, hard clams, menhaden studies, and Saltonstall-Kennedy funds for state research. The Chesapeake Bay Section includes discussions of projects concerned with croaker, blue crab, Chesapeake Bay Institute, shad, cooperative striped bass program, oysters, joint legislative committee on migratory finfish, menhaden, clams, deposits of mine waters in Chesapeake Bay, catch statistics, and finfish research. Under the South Atlantic Section a discussion of the following programs is included: cooperative offshore research program, shrimp, shad, license fees and severance taxes, catch statistics, cooperative striped bass program, bluefin tuna, gear development, out-of-state boats in inland waters, sale of fish by anglers, pollution, blue crabs, marketing survey of Florida fisheries, southern oyster technological

research, and recommendations of the International Law Commission. Another section of the report deals with the following general subjects: catch statistics; Northwest Atlantic fisheries; Amendments No. 1 and No. 2 to the Atlantic States Marine Fisheries Compact—Common Fisheries and Inland Fisheries; fisheries research; legislation needed; activity of the fishing industry; the growing giant—sportfishing; vessel insurance survey; cooperative striped bass program; Federal water pollution control legislation; fisheries education; Northern Regional Committee on Marine Science; and report of International Law Commission re territorial waters and offshore fisheries.

- (Gold Coast) Report of the Fisheries Department for the Year 1954 55, by F. R. Johnson, 10 pp., illus., printed, 2s. (28 U. S. cents), Government Printing Department, Accra, Gold Coast, 1956. This report, which covers the period from April 1954 through March 1955, describes the activities of the Fisheries Department as follows: (1) continued experiments in the use of motor surfboats as fishing vessels and the training of crews; (2) trawl catch; (3) construction of a fishing harbor at the port of Tema; (4) cance fisheries; (5) building of motor fishing vessels in the Department's yard at Sekondi; and (6) development of the river fisheries.
- Growth Studies in the Quahog, VENUS MERCENARIA, by Alton H. Gustafson, 11 pp., illus., processed. (Reprinted from Proceedings of the National Shellfish Association, vol. 45, pp. 140-150, 1954.) Department of Sea and Shore Fisheries, Vickery-Hill Bldg., Augusta, Maine. A preliminary and progress report of the growth studies of the quahog, Venus mercenaria. It deals chiefly with a comparison of growth of populations of several sizes planted under differing conditions in several localities, an analysis of the annual increment, and some comparisons with conditions reported in other geographic areas.
- The Herring Gull-Cormorant Control Program, State of Maine, 1953, by Robert L. Dow, General Bulletin No. 1, 26 pp., printed. Department of Sea and Shore Fisheries, Augusta, Maine, revised Aug. 1953.
- "The Historical Origins of the Three-Mile Limit," by H. S. K. Kent, article, <u>American Journal</u> of <u>International Law</u>, vol. 48, no. 4, October 1954, pp. 537-553, printed, single copy \$2. The American Journal of International Law, 1826 Jefferson Pl. NW., Washington 6, D. C.
- (International Commission for the Northwest Atlantic Fisheries) Statistical Bulletin for the Year 1954, vol. 4, 59 pp., illus., printed. International Commission for the Northwest Atlantic Fisheries, Halifax, N. S., Canada, 1956. This bulletin is divided into two parts as follows: Part I summarizes the 1954 statistics, and Part 2 gives tables of statistics dealing with the fisheries in the Convention Area in 1954. The material is the outcome of the combined work of the fisheries departments of the eleven countries fishing in the Northwest Atlantic, and

comprises a wealth of detailed information on fishing efforts and landings. In previous years the statistics recorded in the Bulletin referred only to groundfish. However, at the Fifth Annual Meeting the Commission decided that statistics should be collected on all species landed in order to get as complete a picture as possible of the total utilization of the marine resources. Accordingly, the present Bulletin includes summary statistics on all marine species landed from the Convention Area. They are listed with their scientific names and the common names used in the member countries.

- Investigations of Indiana Lakes and Streams, vol.

 IV, October 1955, 228 pp., illus, printed. Department of Zoology, Indiana University, Bloomington, Ind. Includes the following reports: "A Study of the Factors Affecting Stream Productivity by the Comparative Method," by Keith Vollmer Slack; "Key to the Fishes of Indiana," by Shelby D. Gerking; "Reproduction of the White Bass, Morone chrysops," by Carl D. Riggs; "The Injection of Latex Solution as a Fish Marking Technique," by Claude S. Davis; "Fish and Fishing in Spear Lake, Indiana," by W. E. Ricker; "Oxygen Depletion in Salt Creek, Indiana," by Myrtle V. Schneller; and "Distributional Ecology of the Cisco (Coregonus artedii) in Indiana," by David G. Frey.
- (Italy) Statistica della Pesca e della Caccia, 1955 (Fishing and Hunting Statistics, 1955), 90 pp., illus., printed in Italian. Istituto Centrale di Statistica, Rome, Italy, 1955.
- Laxfisket och Laxbestandet I Ostersjoomradet Under Senare Ar (The Salmon Catch and the Salmon Stock in the Baltic during Recent Years), by F. Byrachefen and Dr. Gunnar Alm, 63 pp., illus., printed in Swedish with summary in English. (Reprinted from Svenska Vattenkraftforeningens Publikationer 441 (1954:5) pp. 43-100) Svenska Vattenkraftforeningens Publikationer Erhallas Genom Foreningens Expedition, Norrlandsgatan 16, Stockholm, Sweden.
- The Marine and Fresh-Water Plankton, by Charles C. Davis, 562 pp., illus., printed, \$10. Michigan State University Press, East Lansing, Mich.
- (New Zealand) The Fisheries (General) Regulations 1950 (Reprint), 1956/16, 33 pp., printed, Is. 6d. (20 U. S. cents). Marine Department, Wellington, New Zealand, 1956. These regulations are divided into parts, as follows: Part Ir-Preliminary: Part II-Nets and Net Fishing; Part IV-Trawling: Part V-Line Fishing; Part VI-Trawling: Part VI-Swordfishing; Part VIII-Crayfish; Part XI-Seblifish; Part Xa-Flatfish; Part XA-Miscellaneous and General.
- (North Dakota) Fishing Regulations Governing the Taking of Fish in North Dakota during the Calendar Year 1956, 2 pp., printed. North Dakota Game & Fish Dept., Bismarck, N. Dak. Commercial fishing regulations are included as well as sport fishing regulations.

Organization for Trade Cooperation, Department of State Publication 6268, Commercial Policy Series 155, 25 pp., illus., printed, 15¢. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.) Department of State, Washington, D. C., 1956. This pamphlet is designed to give a simple explanation of the OTC--its aims, structure, and responsibilities.

(Pacific Marine Fisheries Commission) Eighth
Annual Report of the Pacific Marine Fisheries
Commission for the Year 1955 (To the Congress
of the United States and to the Governors and
Legislatures of Washington, Oregon and California), 16 pp., printed. Pacific Marine Fisheries Commission, Portland, Ore. Describes
briefly the activities of the Commission and
contains a short resume of the one meeting of
the Commission during 1955. Also included
are summaries of reports submitted by the
participating agencies on the research conducted
in 1955 on the following marine species and fisheries: petrale sole fishery, troll chinook salmon fishery, sablefish (black cod) fishery, ocean
salmon, albacore tuna, and otter trawl fishery.
In addition, contains a financial report of the
Commission.

Papers Presented at the International Technical Resources of the Sea, Rome, 18 April to 10 May 1955, A/CONF. 10/7, United Nations Publica tion Sales No.: 1956. II.B. 1, 383 pp., illus., processed, \$3. International Documents Service, Columbia University Press, 2960 Broadway, New York 27, N. Y., 1956. The International Technical Conference on the Conservation of the Living Resources of the Sea which was held in 1955 marked the second occasion on which a United Nations conference discussed the conservation of fish and other marine resources. Following an introductory paper on the historical development of concepts of conservation, the papers in this volume, which were presented at the Conference, are grouped into the following general categories: broad scientific and theoretical aspects of conservation; operations under existing international conventions; and specific regional resources or problems. Finally, there are two papers dealing in more general terms with the identification of conservation problems and suggestions for their solution. The papers are listed as follows: "Concepts of Conservation," by Michael Graham; "The Scientific Basis for a Conservation Programme," by Milner B. Schaefer; "A First Approximation to a Modern Theory of Fishing," by Michael Graham; "Aspects of the Life History of Certain Resources of the Sea in Relation to the Physical Environment," by United Nations Educational, Scientific and Cultural Organization; "The Conservation of Biological Resources in Coastal Waters, by Gerard Belloc; "Biological Appraisal of the Ocean, and the Problem of Transoceanic Acclimatization," by Lev Zenkevich; "International Conservation Problems, and Solutions in Existing Conventions," by William C. Herrington and John L. Kask; "Regulation of North sea Fisheries under the Convention of

1946," by Cyril E. Lucas; "Conservation Problems in the North-Western Atlantic," by Erik M. Poulsen; "Scientific Investigation of the Tropical Tuna Resources of the Eastern Pacific," by Milner B. Schaefer; "Management of the Halibut Fishery of the North-Eastern Pacific Ocean and Bering Sea," by Henry A. Dunlop; "The International Fraser River Sockeye Salmon Fish-ery," by Loyd A. Royal; "The International Whaling Commission," by Remington Kellogg; "Note on the General Fisheries Council for the Mediterranean," by M. J. Girard; "Fluctuations in the Commercial Fish Populations of the North-Western Pacific in Relation to Environ-mental and Other Factors," by Petr Moiseev; "Fishery Problems and Fishery Conservation in Italy," presented by the Italian delegation; "Life History, Ecology and Behaviour of Important Species Constituting the Fishery Resources of the Seas Around Japan," presented by the Japanese Delegation, with comments by the Korean and Japanese delegations; "The Importance of Conservation of Stocks of Fish and Sea Mammals in Arctic Waters," by Paul Hansen; "Productivity and Intensity of Exploitation of the Adriatic," by Sime Zupanovic; "Migrations of the Adriatic Sardine in Relation to Zooplankton," by Tomo Gamulin; "Some Observations on the Marine Fisheries of Egypt," by Mohamed Zuhdi; "Comments on the Principle of Abstention," by William C. Herrington; and "Classification of International Conservation Problems," by Geoffrey L. Kesteven and Sidney J. Holt.

Participation of the United States Government in International Conferences, July 1, 1953-June 30, 1954, Department of State Publication 5776, International Organization and Conference Series I, 28, 245 pp., printed, 70¢. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.) Office of International Conferences, Department of State, Washington, D. C., 1955. This volume is designed to serve as a record of the official participation of the United States Government in multilateral international conferences and meetings of international organizations during the period July 1, 1953-June 30, 1954. The meetings on fisheries are listed as follows: (1) First Meeting of the International North Pacific Fisheries Commission, Washington, D. C., February 1-12, 1954; and (2) Fourth Meeting of the International Commission for the Northwest Atlantic Fisheries, Halifax, June 14-19, 1954,

(Portugal) <u>Estatistica das Pescas Maritimas no Continente e Ilhas Adjacentes no Ano de 1950</u> (Marine Fisheries Statistics for the Continent and the Adjacent Islands in 1950), 127 pp., printed. Ministerio da Marinha, Comissao Central de Pescarias, Lisbon, Portugal, 1955.

Principles of Plant Layout for Small Plants, by Raymond C. Newton, Technical Aids for Small Manufacturers No. 42, 4 pp., processed. Small Business Administration, Washington 25, D. C., April 1956.

Progress Reports of the Pacific Coast Stations,
No. 105, 30 pp., illus., printed. Fisheries Research Board of Canada, Ottawa Canada,

February 1956. Among the articles included are: "Growth of the British Columbia Shipworm," by D. B. Quayle; "Control of Post-Mortem Bacterial Spoilage of Whales with Chlortetracycline," by P. B. Crean, H. L. A. Tarr and R. B. Barker; "The Relation of Stock Density to 'Milkiness' of Lemon Sole in Union Bay, B. C.," by C. R. Forrester; "Effect of Chlortetracycline and Storage Temperatures on the Quality of Shucked Oysters," by J. W. Boyd and H. L. A. Tarr; "Seasonal Temperature and Salinity Variations in Queen Charlotte Strait, B. C.," by F. G. Barber; "Project NorPac," by A. J. Dodimead; "The Sodium and Potassium Content of British Columbia Sea Foods. II. Some Commercially Important Fresh Fish," by J. McBride and R. A. MacLeod, "Age and Growth of Lingcod (Ophiodon elongatus)," by B. M. Chatwin; "The Conversion of Herring Stickwater to Solubles. III. Preservative Action of Penicillin G on Salmon Offal Stickwater Under Plant Conditions," by W. A. B. Thomson, R. E. E. Jonas, R. A. MacLeod and D. R. Id-ler.

Protokolle zur Fischereitechnik (Journal of Fishery Technology), Heft 15, Ed. III (vol. 3, no. 15), 66 pp., illus., processed, in German. Institut fur Netz- und Materialforschung, Hamburg 36, Neuer Wall 72, Germany, October 1955. Contains two articles: one on experiments with new gear in the river fishery of the Lower Weser, and another on new fibres for use by the fishing industry.

Report to Congress on the Mutual Security Program (For the Six Months Ended December 31, 1955), 37 pp., illus., printed, 35 cents. Mutual Security Agency, Washington, D. C., December 31, 1955. (For sale by Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.)

Research Briefs, vol. 6, no. 1, November 1955, 38 pp., illus., printed. Fish Commission of Oregon, 307 State Office Bidg., Portland 1, Oregon. Includes the following articles: (1) "The Intertidal Mussel, Piddock, and Abalone Resources of Oregon's Outer Coast," by James E. McCauley and Lowell D. Marriage; (2) "The Transfer of Hatchery Fish to Estuarine Waters," by John T. Gharrett; (3) "Escapement of Spring Chinook Salmon and Steelhead Over Willamette Falls in 1953," by Earl F. Pulford; (4) "Fourth Progress Report on Salmon Diet Experiments," by James W. Wood, Wallace F. Hublou, Thomas B. McKee, Russell O. Sinnhuber, and Duncan K. Law; and (5) "Mirgrations of Starry Flounder (Platichthys stellatus) Tagged in the Columbia River," by Sigurd J. Westrheim.

"Role of Science in Marine Fisheries: Limitations and Potentialities," by R. E. Coker, article, The Scientific Monthly, vol. 82, no. 4, April 1956, pp. 176-193, illus., printed, single copy 75¢. The Scientific Monthly, 1515 Massachusetts Ave. Nw., Washington 5, D. C. An excellent discussion of the role of science in marine fisheries. The author discusses briefly some prominent contrasts between the conditions that face

agricultural and fishery scientists. To marine biologists, some of the conditions may well seem too obvious to require discussion. Nevertheless, the conditions are not always fully grasped by those who would support scientific research in aid of fisheries, and their statement in brief is requisite background for consideration of potentialities and limitations. The author discusses in greater detail scientific research and problems in the individual estuarine fisheries and the sea fisheries. In conclusion he states that "it may not be quick and spectacular increases in fishery yield that can be expected but rather gradual and substantial improvement, based on scientific and economic studies to support and supplement individual initiative and enterprise, which must always be a chief reliance. Increasing profit to fishermen and to states and wiser regulation of fishery practices with fewer useless and costly restrictions are to be striven for. It is a virtual certainty that gratifying results will follow from continued and energetic cooperation between administrators, scientists, statisticians, economists, and, most important, fishery operators and fishermen."

"Some Thermodynamic Properties of Fish and their Effect on the Rate of Freezing," by R. A. K. Long, article, J. Sci. Food Agric., vol. 6, 1955, pp. 621-633, printed.

The Sea and Its Rivers, by Alida Malkus, 221 pp., illus., printed, \$2.75. Doubleday & Co., 575 Madison Ave., New York 22, N. Y. Stories about the Gulf Stream and other currents, the ocean's waves and tides, the varied life, and the mineral wealth in the sea.

"Studies on the Conversion of Fish Stickwater to Solubles. I. The Bacterial Decomposition of Stickwater at High Temperatures," by R. A. Mac Leod, D. R. Idler, and W. A. B. Thomson, article, Applied Microbiology, vol. 3, 1955, pp. 202-204, printed. Williams and Wilkins Co., Mt. Royal and Guilford Avenues, Baltimore 2, Md.

"Studies on the Conversion of Fish Stickwater to Solubles. II. Prevention of Bacterial Decomposition of Stickwater at High Temperatures," by D. R. Idler, R. A. MacLeod, W. A. B. Thomson, article, Applied Microbiology, vol. 3, 1955, pp. 205-208, printed. Williams and Wilkins Co., Mt. Royal and Guilford Avenues, Baltimore 2, Md.

(Sweden) Fiske, 1954 (Fisheries, 1954), 78 pp., illus., printed in Swedish with summary in English. Central Bureau of Statistics, Stockholm, Sweden, 1956. An account of the fisheries of Sweden during 1954, with special reference to the salt-water fisheries. Statistics are given for the number of fishermen, fishing gear, and fishing craft in the salt-water fishery, by counties; quantity and value of the salt-water fishery in different fishing areas and by counties; herring fishery (including Baltic herring) by certain counties; and other statistical data. Also includes a list of the different kinds of fish and shellfish in Swedish, Latin, and English.

39 Fathoms Southeast, North Edisto Sea-Buoy off South Carolina, by Francis B. Taylor, Contributions from Bears Bluff Laboratories No. 20. 15 pp., illus., printed. Bears Bluff Laboratories, Wadmalaw Islands, S. C., April 1956. A report covering the activities of the Laboratories' offshore research vessel, <u>T-19</u>, from April 1955 through February 1956. The program includes a study of (1) the ocean habitat of the brown shrimp, Peneaus aztecus, the brown spotted shrimp, Peneaus duorarum, and the white shrimp, Peneaus setiferus; (2) evidences of their migratory movements, spawning habits, and catchability at sea; (3) pelagic movements of the crab family, especially the blue crab, Callinectes sapidus, the only species in South Carolina of any commercial use; (4) bottom characteristics and water temperatures at various depths; and (5) the composition of the aquatic population. While the accent is on the practical aspects of deepsea fishing, due attention is given to the ecological and taxonomic requirements of the program.

Tunas of the Genus THUNNUS of the Northern Car-ibbean, by Harvey R. Bullis, Jr., and F. J. Mather, III, American Museum Novitates Number 1765, 12 pp., illus., printed. The American Museum of Natural History, Central Park West at 79th St., New York 24, N. Y., April 6, 1956. A report of the Service's exploratory fishing expedition in the northern Caribbean. Observations show that all five species of the genus <u>Thunnus</u> (bluefin tuna, \underline{T} . $\underline{\hat{T}hynnus}$; albacore, \underline{T} . $\underline{alalunga}$; blackfin tuna, \underline{T} . $\underline{atlanticus}$; Atlantic big-eyed tuna, T. obesus; and yellow-fin tuna, T. albacares) known to occur in the Atlantic may be found in the Caribbean. The authors state that "Three of these, the yellowfin, the albacore, and the Atlantic big-eyed, were encountered in sizes which may be fished efficiently by the long-line method and utilized in canneries. This may be a factor of some importance to the new tuna industry that is being started in Puerto Rico, as dependence on a single species might result in serious fluctuations in supply. A further implication that may be drawn from these observations is that the yellowfin tuna, the albacore, and the Atlantic big-eyed, which are known to be abundant in the eastern Atlantic as far west as the Azores, may be distributed all the way across the tropical and subtropical parts of that ocean. This suggests the possibility of an extensive tuna resource in the tropical Atlantic."

United States Exports of Domestic and Foreign
Merchandise (Commodity by Country of Destina-

tion), Calendar Year 1955, Report No. Ft 410, Part II, 403 pp., processed, \$1.75. Bureau of the Census, U. S. Department of Commerce, Washington, D. C., April 1956. (For sale by the Superintendent of Documents, Washington 25, D. C.)

The Use of Equipment and Techniques in Applied Shellfish Management, by Dana E. Wallace, 3 pp., processed. (Reprinted from Proceedings of the National Shellfish Association, vol. 45, pp. 209-211, 1954) Department of Sea and Shore Fisheries, Vickery-Hill Bldg., Augusta, Maine. Maine's hard and soft-shell clam fishery is dependent upon natural sets, their survival and growth to commercial size, and, in the soft-shell industry, the efficiency with which the clams are harvested. This article summarizes the projects of the Department of Sea and Shore Fisheries as well as cooperative work with the Fish and Wildlife Service Clam Investigations, and the application of results as carried on with shellfish producing communities.

The Whiting (GADUS MERLANGUS L.) in the North

Sea, by R. W. Ellis and R. Jones, Scottish

Home Department Marine Research No. 2, 28 pp., illus., printed, 5s. (70 U. S. cents). Her Majesty's Stationery Office, Edinburgh, Scotland, 1956. The whiting is distributed over most of the fishing grounds of the North Eastern Atlantic but of these the North Sea is much the most important in contributing more than 50 percent of the European landings. This report dis-cusses the distribution of O and I group whiting, adult distribution, brood fluctuations, growth, and the relationship between yield and mortality rate. Adult whiting are found all over the North Sea although their center of density is no longer in the central regions but tends to be farther to the north. Whether this can be regarded as evidence of a northerly migration with age, or simply as the consequence of the much higher rate of fishing that takes place in the central area, it is not possible to say. A study of the commercial whiting statistics revealed that there had been an increase in post-war landings associated with a decrease in the total fishing effort. A theoretical relationship between fishing mortality rate and yield was derived for the whiting and it was concluded that the post-war increase in landings was such that it could reasonably have been due to the decrease in fishing effort that actually took place.

The Wonderful World of the Seashore, by Albro Gaul, 247 pp., illus., printed, \$5. Appleton-Century-Crofts, Inc., 35 W. 32nd St., New York 1, N. Y.



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PUBLICATION CATALOGUES UNITED STATES FISHERY PUBLICATIONS

If it pertains to commercial fishing—if it has been printed by the Government—if the subject matter falls anywhere between "abaca," which is a fiber, and Zuiho Maru," which is a research vessel—and if the author's name should happen to be in that part of a bibliography beginning with "Abernethy, R. F."

Fishery Publication Index 1920-54

Circular 36

Fish and Wildlife Service

United States Department of the Interior

and ending with "Zobairi, R.A.K."-then it will be listed in the Fishery Publications Index 1920-1954, recently published by the U.S. Fish and Wildlife Service as Circular 36.

This new publication supplements "An Analytical Subject Bibliography of Publication of the Bureau of Fisheries, 1871-1920." This completes the indexing of all Government fishery publications from the time the Federal Government took official interest in commercial fishing in 1871 to and including the year 1954.

The new Index is in three parts—the Publications Series, the Author Index, and the Subject Index. The Subject Index lists several thousand things and conditions studied or observed by fishery scientists and technicians over the 34-year period. The topics touch almost every conceivable phase of the fishery business, from the control of fungus on pike

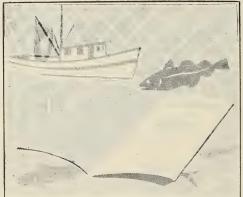
eggs to freezing fish, cooking shrimp, deep-sea trawling, and control of the sea lamprey. More than a thousand technical and scientific authors are listed with a cross-reference to their contributions to fishery research and services.

In the Publications Series will be found a listing of every article on fisheries printed by the Government since 1920, its title and a reference to the Series in which it appeared. The media listed in this section are: Administrative Reports, Circulars, Conservation Bulletins, Current Fishery Statistics, Documents, Economic Circulars, Fishery Bulletins, Fishery Circulars, Fishery Leaflets, Investigational Reports, Market Development Leaflets, Progressive Fish Culturist, Regulatory Announcements, Research Reports, Separates, Special Scientific Reports-Fisheries, Statistical Digests, and Test Kitchen Series.

Circular 36 is for sale by the Superintendent of Documents, United States Government Printing Office, Washington 25, D. C., for \$1.50 a copy.

FISHERY STATISTICAL PUBLICATIONS

Fishery Leaflet 432, <u>Fishery Statistical Publications of the Fish and Wildlife Service</u>, has been published to acquaint persons interested in the fishing industry with the Statistical and Market News publications released by U. S. Fish



and Wildlife Service. This leaflet shows the titles of the various reports, a brief description of the information contained in each publication, and the frequency with which it is released.

To operate efficiently, an industry must have readily available accurate current information concerning its operations. Data on production prices, sales, stocks, and related information provide a measure of whether an industry is in a healthy or an unhealthy condition. Review of an industry's statistics indicates trends which assist members in arranging their

activities so as to take advantage of changing business conditions. Statistics supply government with the information it requires in peacetime to assist in protecting and developing industry, and in periods of national emergencies they are the foundation on which a government marshalls its strength.

The fishing industry and the governmental agencies concerned with the fisheries are particularly dependent upon statistical information for several reasons. The industry is widely scattered, extending over thousands of miles of coastline and in the waters of the interior. A large portion of the catch is taken by small independent fishermen, and much of it is sold through small dealers who have little contact with other segments of the fishing business. With over 200 species of fish and shellfish taken commercially and with the numerous manufactured products prepared from these various species, it is impossible for any person or agency to follow trends in the fisheries without adequate statistical data.

In order to supply these data, the Fish and Wildlife Service conducts statistical surveys of the fisheries, and assembles information collected by State fishery departments and other local, state, and Federal agencies. Information is obtained on employment in the fisheries, the volume and value of the catch, production of manufactured fishery products, freezings and cold-storage holdings, foreign trade statistics, and related information on a monthly and annual basis. Daily and weekly data relating to market conditions are also collected in the more important marketing or producing centers. The data collected in these various ways are published in a large number of statistical bulletins, Fishery Market News reports, and other publications. The most complete annual data are published in the Statistical Digests.

Copies of Fishery Leaflet 432 are available free from the Division of Information, U. S. Fish and Wildlife Service, Washington 25, D. C.

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COMMERCIAL DEVIEW FISHERIES LEVIEW



Vol. 18, No. 8

AUGUST 1956

FISH and WILDLIFE SERVICE United States Department of the Interior Washington, D.C.

JOHN L. FARLEY, DIRECTOR



COMMERCIAL FISHERIES REVIEW



A review of developments and news of the fishery industries prepared in the BRANCH OF COMMERCIAL FISHERIES

A. W. Anderson, Editor

J. Pileggi, Associate Editor H. M. Bearse, Assistant Editor

Mailed free to members of the fishery and allied industries. Address correspondence and requests to the: Director, Fish and Wildlife Service, U.S. Department of the Interior, Washington 25, D.C.

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The printing of this publication has been approved by the Director of the Bureau of the Budget, August 2, 1955. (8/3J/57)

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COMMERCIAL FISHERIES REVIEW

August 1956

Washington 25, D.C.

Vol. 18, No. 8

NEW PRODUCTS FROM FISH OILS

Part I - Introduction

By Maurice E. Stansby*

BACKGROUND

Fish oils are made up of components having an unusual chemical structure. The fatty acids occurring as glycerides are, in a large part, of unusually long-chain length, with C_{20} and C_{22} chains being found in substantial quantities. The presence of these long chains makes possible the occurrence, again in substantial quantity,

of fatty acids containing an unusually high number of double bonds, with as many as six being not uncommon. Such long-chain polyunsaturated fatty acids are also found in animal and vegetable oils, but the quantity present is of very small magnitude. In fish oils, sufficient quantities occur as to make commercial utilization feasible, should there be sufficient demand for compounds of such structure.

In the past, very little consideration has been paid to the presence of these unique chemical characteristics of fish oils. Rather, the bulk of the fish oil has been sold on the basis of its



Fig. 1 - Preparation of derivative of fish oil for use as collector in ironore flotation,

general properties, usually as a substitute—all too often as a cheaper substitute—for animal or vegetable oils. Many times, the high degree of unsaturation, rather than being an asset, is a liability which causes a decrease in market value. Because fish oils are subject to odor reversion, when used as a substitute for other oils, such properties cause the fish oils to be sold at lower prices. Only a very limited portion of the fish oils sold has been used so as to take advantage of these unusual and highly specific chemical properties.

Byproducts of the meat industry include oils and fat which for many years were in the same category as fish oils so far as making use of special chemical characteristics is concerned. Within the past decade, a considerable amount of research on the part of the meat industry has greatly increased the profits realized from the byproducts. As a result of this research, a large number of chemical products are now made from meat-packing waste. The importance of this development to the meat-packing industry was pointed out in an article in Chemical Week (Anonymous 1954). One large meat-packing concern realizes 78 percent of its total profits from

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these byproducts, although the byproducts represent only 15 percent of total sales.

RESEARCH ON FISH OILS

Before fish oils can be utilized extensively as a source of chemicals, making use of their content of unique chemical groupings, a considerable amount of basic research must be carried out. This research must first show exactly what the chemical structures of fish oils are and then must show which reactions of the unsaturated long-chain fatty acids will produce useful chemical compounds. The type and amount of basic research required is so extensive that there is little likelihood that it can be carried out either in laboratories of the fishing industry or of the Government. Considerable fundamental research, especially in university laboratories, is needed before any extensive practical applications can be feasible.

It is sometimes hard to understand why more basic research has not been carried out in the past on fish-oil fatty acids. One reason is undoubtedly the fact that these fatty acids are very unstable and exceedingly difficult to work with. Another barrier to much research has been the fact that the pure unsaturated fatty acids of the long-chain lengths have not been available commercially and would have to be isolated from the fish oils by the laboratory carrying out the research. The importance of the ready availability of the fatty acids is shown by the fact that with such fatty acids as oleic, linoleic, linolenic, and arachidonic, which are available for purchase, research has been more extensive. When it is also considered that the fish oils themselves are not so readily available as oils such as linseed or cottenseed, the reasons why research on fish-oil fatty acids has been limited are apparent.

INITIAL WORK AT SEATTLE FISHERY TECHNOLOGICAL LABORATORY

In discussions over a period of years with technical members of the fishing industry, it was unanimously agreed that research as to the chemical properties and reactions of fish oils was a potentially fruitful field. Because of the exceedingly specialized nature of this field and the need for highly-qualified organic chemists and special expensive equipment, little more than discussions developed.

Early in 1953, the Seattle Laboratory of U. S. Fish and Wildlife Service decided that, in spite of the difficulties of this field of research, some attempt to obtain and publish research results was long overdue. A very small-scale program was therefore initiated to explore some of the possibilities. It was realized that considerable work along these lines had been carried out in chemical laboratories of some oil processors. Since, however, these results had, for the most part, never been published, they were not available either as a starting point for the present research or as a guide to fish-oil producers to indicate the value and potential use of their products. It was therefore necessary to repeat much relatively elementary work which undoubtedly had already been carried out but which had never been published.

In this early work, the Seattle Laboratory made extensive use of part-time graduate organic chemistry students from the University of Washington. This made possible considerable research work in the field of organic chemistry without exceeding the limited budget available. Much of this work was exploratory rather than specific. Reactions of unsaturated fatty acids described in the literature were tried, first with pure fatty acids, then with mixed fish-oil fatty acids. At least partial fractionation of the fatty acids was needed since otherwise it was impossible to identify the reaction products in the complex mixture of fatty acids obtained from the saponified fish oils.

It was realized from the start that the extent of research needed was so great that the small amount which could be carried out in Fish and Wildlife Service

laboratories under the limited regular budget would make almost imperceptible progress toward solving the problems. It was hoped rather that if a few publications on fish-oil chemistry could be made available, other laboratories, especially in universities, might be interested to enter this field of research.

The chance to get such expanded work under way came much sooner than anticipated. As a result of the funds provided by the Saltonstall-Kennedy Act of 1954, research contracts were let in 1955 for work on fish oils at a considerable number of universities. This Fish and Wildlife Service program then was transferred from a limited local project of the Seattle Laboratory to one of nationwide scope. In the resulting expansion, it was necessary to reorient the research program on fish oils at the Seattle Laboratory.

PRESENT PROGRAM AT SEATTLE LABORATORY

One of the primary responsibilities of the Seattle Laboratory, under the expanded oil-research program, has been the coordination of research on oils at those laboratories west of the Mississippi River which participate in Fish and Wild-life Service programs. These programs include several basic ones at Hormel Institute of the University of Minnesota on the chemistry, composition, and reactions of fish oils; and one at the University of California, Food Technology Department, on oxidative deterioration in fishery products. Several other contract research programs on applied research on fish oils are also included. Work at the Seattle Laboratory has thus taken on a new aspect in addition to the research begun earlier. It has been necessary to carry out considerable work in connection with providing authentic fish-oil samples for use by the various contract research laboratories. In some cases, it is necessary to extract and prepare the oils in the laboratory. Other activities involve reviewing the programs and seeing that information found by one laboratory which might be helpful to another is promptly made available.

To adequately coordinate these highly-specialized programs, considerable first-hand knowledge of the research is needed if optimum results are to be obtained. For this reason, some of the research started under the initial program when it was a purely local project has been continued at Seattle. Projects already under way have been pushed toward conclusion. Work will be continued in important fields not covered by existing contracts with other laboratories. One such field is concerned with fractionation of fatty acids from fish oils into fractions containing compounds of similar properties. Such fractionation will be needed in order to utilize fish oils as a source of new chemical compounds. Several methods are available, but not enough is known about their relative advantages and disadvantages. One paper (Domart, Miyauchi, and Sumerwell 1955) sovering work done at this laboratory on urea fractionation of fish-oil fatty acids has already appeared. Another one describing a new urea-countercurrent-distribution method for fish-oil fatty-acid fractionation is in preparation.

Subsequent papers in this series will be concerned with either (1) reporting the early survey studies carried out at the Seattle Laboratory on reactions of fish oils or (2) continuing research especially on separations of the component constituents of fish oils.



"BROWN-SPOTTING" IN THE SOUTHERN OYSTER

By Milton Fingerman*

The bodies of Atlantic Coast oysters are normally creamy white except for some brown pigment deposited at the edges of the mantle. Southern oysters, in contrast, show varying degrees of body coloration from tan to deep brown. The pigment in tan oysters is homogeneously distributed over the mantle surface. Some

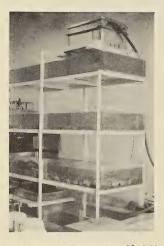


Fig. 1 - Large plexiglass aquaria used for holding live oysters for physiological study of Southern oysters being conducted at Tulane University.

pigment in the shell is mirrored by the distribution of "brownspot" on the body of the oyster. Shells have been sectioned in order to determine the pattern of purple and brown-pigment deposition. The pigments are usually found distributed in the prismatic and nacreous layers of the shell. When the pigment is found on the inner surface of the shell, in the nacreous layer, sectioning reveals that the coloration extends at least two to three millimeters into the prismatic layer from the inner surface of the shell. There may be deeper layers of pigment not associated with the inner layers of pigment, indicating the formation

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brown pigment is also concentrated at the edges of the mantle and quite frequently on the portions of the mantle surrounding the adductor muscle. In "brown-spotted" oysters, the quantity of brown pigment is markedly increased. The pigment may be uniformly distributed throughout the outermost portion of the mantle or concentrated in restricted regions of the mantle. Experiments are currently in progress to determine (1) the nature and origin of "brown-spotting" in Southern oysters, (2) why some Southern oysters produce more "brown-spots" than others, and (3) why Southern, and not Northern, oysters produce "brown-spots."

Histological sections of "brown-spotted" oyster tissues have been prepared. The "brownspotting" appears to be restricted to epithelial cells of the mantle. The brown pigment may easily be scraped with a scalpel from the surface of a living oyster. The "brown-spotted" material has a mucoid appearance, probably due to the mucus always present on the oyster body surface. When observed with the microscope, this "brown-spotted" material appears to be composed of numerous golden-brown granules.

There is a positive correlation between the intensity of "brown-spotting" on the oyster body and the amount of purple or brown pigment deposited in the shell. The pattern of



Fig. 2 - Water bath with temperature control and stirrer. The kymograph to the right is for recording shell movements of oysters under test for reaction to higher temperatures.

1/ This study was conducted under a contract between Tulane University and the U, S, Fish and Wildlife Service. It was financed with funds provided under P. L. 466, 83rd Congress, approved July 1, 1954 (referred to as the Saltonstall-Kennedy Act).

of "brown-spot" material need not be a continuous process. The presence of pigment throughout the shell suggests that "brown-spotting" first appears in oysters that are younger and smaller than those collected by commercial oystermen. Furthermore, if an imperfection in the form of a depression is present on the internal surface of the shell, the portion of the body lying immediately above the imperfection usually has brown pigment deposited in the form of an outline of the imperfection.

Body coloration of oysters from Delaware Bay and Chesapeake Bay was compared with Southern oysters. The Northern oysters showed no spotting nor was color evident on the shells to any extent except in the region where the adductor muscle attaches to the shell.

Experiments designed to induce spotting have not been successful. Oysters receiving implants of "brown-spotted" oyster tissue were placed in aquaria for a week when they were shucked and inspected for "brown-spot." Oysters were also maintained for one week in sea water containing homogenized "brown-spotted" oyster tissue. Neither group of oysters showed a significant increase of intensity of "brown-spotting." The lack of success of these experiments is further indication that "brown-spotting" is initiated early in the life of the Southern oyster.





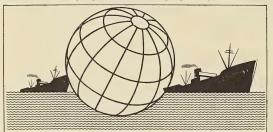
FISHERY TARIFF CONCESSIONS IN 1956 GENEVA NEGOTIATIONS

By A. M. Sandberg*

BACKGROUND

Trade agreement negotiations were completed by 22 countries, including the United States, during the conference which was held at Geneva, Switzerland, beginning on January 18, 1986, under the auspices of the contracting parties to the General Agreement on Tariffs and Trade. The 22 countries were: Australia, Austria, Belgium, Canada, Chile, Cuba, Denmark, Dominican Republic, Finland, France, Federal Republic of Germany, Haiti, Italy, Japan, Luxembourg, Netherlands, Norway, Peru, Sweden, Turkey, the United Kingdom, and the United States.

This conference was one of a series of multilateral meetings held since World War II for the purpose of exchanging reciprocal concessions on tariffs. These coun-



tries and others of the 35 countries which are parties to the GATT had also negotiated tariff reductions at earlier conferences held at Geneva (1947), Annecy (1949), Torquay (1950-51), and at Geneva in 1955, when negotiations were held for the accession of Japan to the GATT.

The United States obtained tariff concessions in these negotiations on over-

all exports valued at approximately \$400 million. United States export trade will also benefit from additional concessions granted in the course of negotiations between other pairs of countries; the total value of these indirect benefits is not now available. Products on which concessions were obtained by the United States cover a wide range of agricultural and industrial products.

In direct tariff negotiations, concessions were obtained by the United States for certain fishery export commodities, including certain shrimp, salmon, and oyster products. A description of these concessions is contained in table 1.

In return for the concessions obtained, the United States granted concessions valued at \$677 million in terms of United States imports of all commodities in 1954 from the country with which the concession was negotiated. Imports of the same items from other participating countries amounted to \$134 million, thus bringing the total of benefits to all participants to \$811 million.

Among the fishery items on which tariff concessions were granted by the United States were certain fish and fish-liver oils, shark and whale oil, isinglass, pearl essence, certain canned smoked sardines, antipasto, fish cakes, canned herring snacks and tidbits, mild-cured salmon, and certain unboiled caviar. A listing and further description of the items is given in table 2.

United States reductions were generally limited to reductions in duty of about 15 percent. In many cases, the reduction in duty exceeded the 15-percent limitation prescribed by the Trade Agreements Extension Act. The law permits minor * Commodity-Industry Analyst (Fisheries), Economics and Cooperative Marketing Section, Branch of Commercial Fisheries, U. S. Fish and Wildlife Service, Washington, D.C.

additional reductions on items in order to simplify tariff rates. The rules for applying these additional reductions of "roundings" provide that such reductions may not exceed one-half of one percent ad valorem or its equivalent if the tariff is in such terms as cents per pound.

Table 1 - Fisher	Table 1 - Fishery Items on which the United States Obtained Concessions from Other Countries, Geneva, 1956									
Country and Tariff Item No.	Brief Commodity Description	Before A	tatus Under Ag	reement	Imports from the U. S., 1954 (US\$1,000)					
BENELUX ex 103 120a3A	Menhaden oil Canned salmon	Free 20% 1/						Fre 15%		1,710 215
CANADA 118c ex 123(c) ex 123(c) 124 125 126 127 ex 133 ex 133 ex 133 418 680a	Shrimp in sealed containers Shrimp prepared or preserved Oysters, prepared or preserved Oysters shelled in bulk Oysters shelled in cans, not over 1 pt., Oysters shelled in cans, over 1 pt., not over 1 qt. Oysters shelled in cans, over 1 qt. Oysters shelled and frozen N.O.P. Shrimp presh or frozen Shrimp peeled and deveined Fish meal machinery and parts Sponges of marine production	To U. S. 15% $22\frac{1}{2}\%$ $22\frac{1}{2}\%$ $22\frac{1}{2}\%$ 5ϕ gal. $2\frac{1}{2}\phi$ can $4\frac{1}{2}\phi$ can $4\frac{1}{2}\frac{1}{2}\%$ $17\frac{1}{2}\%$ 10% $12\frac{1}{2}\%$	$\begin{array}{c} \textbf{B.P.} \ 2/\\ 15\% \\ 15\frac{1}{2}\% \\ 15\frac{1}{4}\% \\ 5 \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \$	To U. S. 10% 10% 15% Free Free Free Free 10% 10% 10% Free	B.P. 2/10% 10% 15% Free Free Free 10% 10% 15% Free Free Free Free Free Free Free Fre	$\left.\begin{array}{c} 1,171\\ \text{N.S.S.}\\ 18\\ 476\\ \end{array}\right\}$ $\left.\begin{array}{c} 65\\ \frac{3}{2} \begin{pmatrix} 147\\ 642\\ \text{N.S.S.}\\ 682\\ 33\\ \end{array}\right.$				
JAPAN ex 324-1 031-0341 Shrimp, prawn, and lobsters, fresh shelled or frozen		10% 5%		, 0	11					
NORWAY 141 147	Canned salmon Salt salmon	Crowns P 0.30 0.30		0.30		0.	25 25	- 3		
UNITED KINGDOM 3 GAV	Prawn and shrimp, canned	MFFN4/ 10%	Pref. Free	MFFN 7½%	4/Pref.	3/6				

2/ The British preferential rate applies to imports from all countries of the British Commonwealth. The preferential shown is the lowest rate under Canada's pref-

3/ Trade based on United States export statistics.
4/ Most favored nation.

Abbreviations: N.O.P. - not otherwise provided. N.S.S. - not specifically specified in foreign trade statistics.

Other countries' concessions, on the other hand, were in many cases deeper than the 15 percent permitted under the United States negotiating authority. For example, almost 80 percent of Germany's concessions consisted of tariff reductions of 25 percent or more. Half of Canada's concessions to us were reductions of more than 21 percent, and on a few items there was even complete elimination of duties. On \$13 million of United States trade, preferences were eliminated by Canada.

United States reductions will be put into effect in three annual stages in accordance with the provisions of the Trade Agreements Extension Act of 1955. The first of these stages was to enter into force on and after June 30, 1956; the next two stages are scheduled to become effective in each of the next two years, respectively. With few exceptions, other countries will put in effect all of their concessions at one time.

Public notice of intention to negotiate this agreement was given on September 21 and December 9, 1955. At the same time there were published lists of items on which concessions in United States tariffs would be considered. Interested parties were given opportunity to submit written briefs containing their views on concessions to be obtained and granted, and public hearings were held beginning October 31, 1955, and January 17, 1956, to obtain views from interested parties. The Committee for Reciprocity Information which conducted the hearings was made up of persons also members of the Interdepartmental Committee on Trade Agreements, which is the body formulating recommendations to the President on trade agreement matters. The information furnished in the written briefs and during the public

ariff	Stat. Class.	Table 2 - Fishery Items on wh		Rate of	Duty		Negotiating	Total U. S.
Par.	(1956)	Brief Commodity Description	January 1, 1955	1st Stage	va 1956 Agreem 2nd Stage	ent 3rd Stage	Country	Imports, 195 (US\$1,000)
34	2220.250	Advanced in value: Shark-liver oil, including dogfish-liver oil	5% plus 1¢ per 1b. IRC tax	43% plus 0.95¢ per lb. IRC tax	4½% plus 0.9¢ per lb. IRC tax	4% plus 0.85¢ per lb. IRC tax	Japan	540
	2220,260	Shark oil including dogfish oil		"	"	"	"	. 14
	2220.270	Fish oils, n.e.s. (except cod oil and herring oil and not in- cluding whale oil)	5% plus ½¢ per lb. IRC tax	4% plus 1.4¢ per lb. IRC tax	4½% plus 1.3¢ per lb. IRC tax	4% plus 1.25¢ per lb. IRC tax		2
	2220.300	Fish-liver oils, n.e.s. (ex- cept cod-liver oil)	н	11	n	11	11	1,629
1669	2210,920	Not advanced in value: Shark oil and shark-liver oil, including dogfish and dogfish-liver oil	Free plus 1¢ per lb. IRC tax	Free plus 0,95¢ per 1b, IRC tax	Free plus 0.9¢ per lb, IRC tax	Free plus 0,85¢ per 1b, IRC tax	"	-
	2210.980	Fish oils, n.e.s. (except cod oil and herring oil and not including whale oil)	Free plus 1½¢ per lb. IRC tax	Free plus 1.4¢ per lb. IRC tax	Free plus 1,3¢ per lb, IRC tax	Free plus 1.25¢ per lb. IRC tax	11	2
41	0941.700	Isinglass	25%	23½%	22½%	21%	United Kingdom	29
52	0803.000	Sperm oil, crude	14¢ per gal.	1.15¢ per gal.	1.1¢ per gal.	1¢ per gal.	Norway	804
	0803.500	Whale oil, n.s.p.f.	3¢ per gal. plus 1½¢ IRC tax	2.8¢ per gal. plus 1.4¢ per gal. IRC tax	2.7¢ per gal. plus 1.3¢ per gal. IRC tax	2½¢ per gal. plus 1¼¢ per gal. IRC tax	Canada	82
	0808.710	Shark oil, including oil pro- duced from dogfish, n.s.p.f.	5% plus 1¢ per lb. IRC tax	43% plus 0.95¢ per lb. IRC tax	42% plus 0:9¢ per lb. IRC tax	4% plus 0.85¢ per lb. IRC tax	Japan	-
66	8420.270	Pearl essence	12½%	112%	11%	11%	Norway	347
717(a)	0055.500	Swordfish, whole or be- headed or eviscerated	1½¢ per lb.	Bour	and at $1\frac{1}{2}$ ¢ per lb.		Peru	1/161
717(b)	0060.320	Swordfish, filleted, skinned, boned or divided into portions	1½¢ per lb.	Bour	nd at 1½¢ per lb.		Peru	1/118
717(c)	0062,250	Shark fins, dried and unsalted Product of Cuba	$\frac{5}{8}$ ¢ per lb. $\frac{1}{2}$ ¢ per lb.	0.59¢ per lb. Bour	0.56¢ per lb. nd at ½¢ per lb.	0.53¢ per lb.	Japan Cuba	52 4
718(a)	0063,390 (part)	Sardines, smoked, in oil or in oil and other substances, neither skinned nor boned, valued over 30¢ per lb. in- cluding weight of immediate container (canned)	15%	14%	13½%	12½%	Norway	3,400 (est.)
	0063.340	Sardines, smoked, in oil and in oil and other substances, neither skinned nor boned, valued over 18¢ but not over 23¢ per lb., including weight of immediate container (canned)	15%	14%	13½%	12½%	Norway	116
	0066.300	Antipasto, in oil or in oil and other substances, valued over 9¢ per lb. including weight of immediate contain- er (canned)	15%	14%	13½%	12½%	Italy	170
	0066,700 (part)	"Other fish" in oil or in oil and other substances, valued over 9¢ per pound including weight of immediate container Note: Includes such products as canned smoke packed in oil or in oil and other substances (d	30%	28½%	27% ts, fillet of mackerel, a	25½%	Denmark ecciatries when	150 (est.)
718(b)	0067.300	Fish cakes, balls, and pud-	oes not include prepare	fish sticks).				
		dings not in oil or in oil and other substances, in airtight containers weighing with con- tents not over 15 pounds each	6±%	5 3 %	5 <u>1</u> %	5%	Norway	178
	0067.720	"Other herring" (includes snacks, tidbits, rollmops, sprats) not in oil or in oil and other substances in air- tight containers weighing with contents not over 15 pounds each (canned)	6 ¹ / ₄ %	53%	5½%	5%	Norway	1, 971
	0067.800	Bonito in brine in airtight containers weighing with contents not over 15 pounds each (canned)	12½%	Bour	nd at 12½%		Peru	547
719	0068.000	Pickled or salted salmon	10%	9½%	9%	8 1/4/0	Canada	68
721(d)	0079.200	Caviar (except sturgeon roe) not boiled and not packed in airtight comtainers, n. s. p. f.	5¢ per 1b.	4 ³ ₄¢ per lb.	4½¢ per lb.	4¢ per lb.	Japan and Canada	67
775	1250.250	Pastés, balls, puddings, hash and similar mix- tures of vegetables; meats or fish, n.s.p.f.	25%	23½%	22½%	21%	Italy	46
538	0990,290	Shells and mother-of-pearl engraved, cut, ornamented or manufactured concession is a rebinding of rates already bound in all Revenue Can Tax. n.e.s not elsewhere spec	17½%	16½%	15½%	15%	Japan .	249

hearing, as well as all relevant information available within the Government, and digests of confidential data and "peril point" findings prepared by the Tariff Commission on items under consideration were considered. Digests were prepared by the Departments of Commerce, Agriculture, and Interior on items for which the United States sought to obtain concessions. This material was studied first by interdepartmental subcommittees, then by the Committee on Trade Agreements, which formulated recommendations to the President at every stage of the preparations. No concession was offered without the President's approval, and the overall results were also subject to his approval.

The Department of the Interior participated in the preparation for these negotiations. Harry M. Shooshan, International Activities Assistant, Technical Review Staff, represented the Department of the Interior at the tariff negotiating conference, as well as on the Committee for Reciprocity Information and Trade Agreements Committee deliberations.

The nongovernmental advisers assigned by the President to attend the deliberations at the Geneva conference reported as follows to the President: "Having had an opportunity to observe at first hand the tariff negotiations now drawing to a conclusion at Geneva, we are happy to report to you that the interests of our country have been well served. We have been greatly impressed by the competence of the career men from the nine departments and agencies of the Government who have handled these important negotiations. The members of the Trade Agreements Committee, particularly, have worked long hours for many months with a high degreee of concentration and effort.

"We were particularly impressed with the unfailing concern of our negotiators to advance the broad interests of the United States. By no stretch of the imagination could the tariff negotiations, as we observed them, be called a give-away program. The entire program is, of course, based upon reciprocal concessions, and we found our negotiating teams and the Trade Agreements Committee to be bargaining in what seemed to us to be the best Yankee tradition. They insisted on obtaining concessions of full value for each concession made by the United States. There is great need for a better public knowledge of these facts."

TARIFF CONCESSIONS OBTAINED BY THE UNITED STATES IN DIRECT NEGOTIATIONS

In direct negotiations, the United States obtained from other countries concessions in their duties for certain fishery export commodities. These include various forms of shrimp, salmon, and oysters. Tariff concessions obtained by the United States from other countries were also scheduled to go into effect on June 20, 1956.

BENELUX CONCESSIONS ON MENHADEN OIL AND CANNED SALMON: A duty-free binding was obtained for menhaden oil. This product is also exempt from Netherlands monoply fees or corresponding Belgian-Luxembourg charges if imported for further processing. Benelux imports from the United States in 1954 were valued at \$1,710,000.

The duty on canned salmon has been suspended for some time. The reduction in the statutory rate of duty from 20 to 15 percent was obtained. This provides that should the suspension of duty be lifted, the duty would revert to the 15-percent rate, rather than the higher rate.

CANADA IN CONCESSIONS ON SHRIMP, OYSTERS, AND SPONGES: The United States obtained direct tariff concessions from Canada which are of substantial value to the domestic shellfish industry. These negotiations resulted in the elimination of the margin between the preferential rates applying to countries of the British Commonwealth and those to the United States.

Duties were eliminated on shelled oysters and reduced on fresh, frozen, and canned shrimp. Canadian imports from the United States in these shellfish items totaled \$2,519,000 in 1954. On fresh or frozen shrimp, the duty was reduced from $12\frac{1}{2}$ percent to 10 percent ad valorem. According to United States export statistics, shipments of this product to Canada were valued at \$642,000 in 1954 and \$888,000 in 1955. On canned shrimp, for which United States export trade to Canada amounted to \$1,188,000 in 1954 and \$1,875,000 in 1955, the duties were cut from 15 to 10 percent.

Reductions were also negotiated in the duties on prepared and preserved and peeled and deveined shrimp. In the former case, the concession lowered the duty from $22\frac{1}{2}$ percent to 10 percent, and in the latter from $17\frac{1}{2}$ percent to 10 percent. Data on these products are not separately shown in the foreign trade statistics.

Duties on prepared and preserved oysters were reduced from $22\frac{1}{2}$ percent to 15 percent. The duty of 5 cents a gallon on oysters shucked in bulk was eliminated as were the duties on shucked oysters in the can. The duties in the latter case were $2\frac{1}{2}$ cents per can for cans not over 1 pint; $4\frac{1}{2}$ cents per can for cans over one pint and not over one quart; and $4\frac{1}{2}$ cents per can for cans exceeding one quart. The $17\frac{1}{2}$ percent ad valorem duty on shucked and frozen oysters was also eliminated. United States oyster exports to Canada, which were valued at about \$700,000 in 1954, will likely be increased as a result of the reductions in the various duties.

The Canadian import duty on marine sponges was reduced from $12\frac{1}{2}$ percent to free status,

JAPANESE CONCESSION ON SHRIMP AND LOBSTERS: Japan's participation in the 1956 tariff negotiations at Geneva came eight months after the completion of the 1955 negotiations. In the postwar years, Japan consistently has purchased more merchandise from the United States than it has sold. This imbalance has been defrayed in large measure by special dollar earnings resulting from the expenditures by and for the United States Armed Forces in Japan. When these special dollar earnings cease, Japan will have to find other sources to compensate for them. In the interest of conserving foreign exchange for the purchase of essential commodities, Japan has exercised strict trade and exchange controls. In 1955, Japan's trade picture improved somewhat and the deficit in trade with the United States was reduced. As a result of this improvement, Japan partially relaxed some of its exchange restrictions.

The rate of duty for shrimp, prawn, and lobsters, fresh, chilled, or frozen was reduced from 10 percent to 5 percent ad valorem. Japanese imports of these products from the United States in 1954 totaled about \$11,000.

NORWEGIAN CONCESSION ON CANNED AND SALTED SALMON: Norway granted a reduction of about 16 percent in its rate on canned salmon and salted salmon. The duty was reduced from 0.30 crowns per kilogram to 0.25 crowns. United States exports of salted salmon to Norway amounted to \$3,000 in 1954. Trade in this item has been hampered by import restrictions but efforts are under way to seek liberalization. No trade was reported in 1955. Norway did not import canned salmon from the United States in 1954 and 1955.

<u>UNITED KINGDOM CONCESSION ON CANNED SHRIMP</u>: The United Kingdom granted a concession on canned shrimp (a reduction of 25 percent, from a duty of 10 percent ad valorem to $7\frac{1}{2}$ percent). United States exports of canned shrimp to that country in 1955 were valued at \$6,000. Trade in this item has been subject to import restrictions.

TARIFF CONCESSIONS GRANTED BY THE UNITED STATES

Concessions were granted to Japan on certain fish and fish-liver oils. The principal concessions granted Norway consisted of reductions in the duty on canned smoked sardines, crude sperm oil, and pearl essence. Our import duty on mild-cured salmon was reduced in negotiations with Canada. The United States duty on imports of swordfish and on canned bonito in brine were bound to Peru. The items negotiated with Peru were previously bound in trade negotiations with other countries but were granted to Peru in this negotiation by direct concession.

Our import-duty reductions will apply to imports into the United States from all free-world countries. The reductions will not apply to imports from the Soviet-dominated bloc.

CERTAIN FISH OILS AND FISH-LIVER OILS, PAR. 34, 52, AND 1169: The oils included in the concessions made by the United States are chiefly fish-liver oils (except cod, cod-liver, and halibut-liver oil), whale oil, and crude sperm oil. Small quantities of viscera and body oils are included. The principal oils are those obtained from the livers of the shark, including dogfish, and from the livers of tuna, swordfish, and other miscellaneous types of fish. Herring, menhaden, and pilchard body oils are not included.

Japan is the principal source of United States imports of fish-liver oils. United States total imports of the oils upon which concessions were made were valued at \$2,188,000 in 1954 of which Japan supplied \$2,055,000. In 1955, imports were valued at \$2,034,000 of which \$1,902,000 was supplied by Japan.

Production of shark-liver oil has declined in the United States from \$937,000 in 1950 to \$298,000 in 1954. Production of other fish-liver oils has also declined but their combined value probably well exceeds the value of the production of shark-liver oils. These natural vitamin oils also encounter sharp competition from synthetic vitamins.

<u>PEARL ESSENCE</u>, <u>PAR</u>. 66: Our rate of duty on pearl essence was reduced from $12\frac{1}{2}$ percent to 11 percent in negotiations with Norway. United States imports of this product from all countries in 1954 totaled \$347,000 and \$250,000 in 1955.

<u>PICKLED OR SALTED SALMON</u>, <u>PAR. 719</u>: The United States granted a concession to Canada which will reduce the duty on canned mild-cured salmon from 10 percent ad valorem to $8\frac{1}{2}$ percent. United States imports during 1954 had a value of \$68,000 and during 1955 of \$41,000.

SMOKED SARDINES:

 $\underline{\text{In oil or in oil and other substances}}, \ \underline{\text{neither skinned nor boned; valued over 30 cents per pound, including weight of immediate container Par. 718(a): Our rate of duty on smoked sardines, in oil or in oil and other substances neither skinned nor boned, valued over 30 cents per pound, including weight of immediate containers was reduced from 15 percent ad valorem to <math display="inline">12\frac{1}{2}$ percent ad valorem in the negotiations with Norway. This concession is a part of an import classification which included similarly prepared sardines valued over 23 cents a pound. No concession was granted on the value bracket over 23 cents but not over 30 cents a pound. Norway has been the principal source of imports of the grade of sardines upon which the concession was made. United States total imports amounted to an estimated \$3.5 million in 1954, and \$4.5 million in 1955.

Domestic production of smoked sardines, comparable to the types imported (valued at over 30 cents a pound) is estimated as less than \$15,000 annually.

In oil or in oil and other substances, neither skinned nor boned; valued over 18 cents per pound, but not over 23 cents including weight of immediate container: Our rate of duty on these products was also reduced. This merely provides for a similar rate of duty for smoked sardines valued over 30 cents a pound. The rate of duty on smoked sardines between 23 and 30 cents a pound was not changed by the negotiations and remains at 15 percent ad valorem. United States total imports of items coming within this class on which the concession was granted were valued at \$116,000 in 1954 and \$54,000 in 1955.

"OTHER FISH" IN OIL OR IN OIL AND OTHER SUBSTANCES, VALUED OVER 9 CENTS PER POUND: Our duty on these products was reduced by a concession to Denmark, primarily to benefit imports of canned sprats which are in certain cases classifiable under this tariff item. United States total imports of these products in 1954 were valued at about \$150,000; in 1955 these imports were valued at \$83,000.

"OTHER HERRING", NOT IN OIL OR IN OIL AND OTHER SUBSTANCES, IN AIR-TIGHT CONTAINERS, WEIGHING WITH CONTENTS NOT OVER 15 POUNDS EACH: Our duty for these products was reduced in a concession to Norway. This item includes such products as canned herring snacks, tidbits, rollmops, and sprats not in oil or other substances. United States total imports of these products in 1954 were valued at \$1,971,000, and in 1955 at \$2,022,000.

NO CONCESSIONS GRANTED ON CERTAIN LISTED ITEMS

A number of items listed for consideration for possible reduction of import duty were not subject to concessions. In some instances, no basis was found for granting concession; in others, peril-point findings precluded granting a concession. Among the items listed for public hearing on which no concessions were granted were sodium alginate, fish livers, refined sperm oil, fresh-water fish fillets, fresh or frozen sablefish, canned mackerel and jack mackerel, fishhooks, nylongill-netting, pearl or shell button blanks, and natural pearls.

TARIFF CHANGES ON FISHERY ITEMS RESULTING FROM NEGOTIATIONS BETWEEN OTHER COUNTRIES

Many of the benefits derived from bindings or reductions of rates of duty which were negotiated between other countries will accrue to United States products exported to the country granting the concession. As a result of the "most-favored-nation" provision of the agreement, concessions granted by one party to any one of the others automatically are extended to all countries participating in the GATT.

Concessions made by other countries of interest to United States fishery industries included the following:

Canada - prepared or preserved mussels; fish hooks.

Norway - nylon fish nets.

United Kingdom - fish meal, fish hooks, fish-cutting machines, caragheen extracts,

Italy - dried cod and haddock, canned salmon, fish hooks.

West Germany - fish fillets, oysters, canned salmon, small herring, prepared or preserved lobster. Principal fishery items included in the negotiations between other countries which are of interest to United States fishery interests are listed in table 3.

Country and	Brief Commodity Description	Rate Under	Country and	Brief Commodity Description	Rate Under	
Tariff Item	Brief Commodity Description	Agreement	Tariff Item	Brief Commodity Description	Agreement	
enada 9c	Whale meat, for use exclusively in the feeding of fur- bearing animals or in the manufacture of feeds for such purposes	Free	Austria (Contd.)	Fishing nets machine-made of a length of more than 100 metres and of a width of more than 3 metres, for persons practising fishing as a profession under certificate of the Federal Ministry of Agriculture and Forestry	Free	
123 Ex (c).	Mussels, prepared or preserved	17½ percent		of the Federal Ministry of Agriculture and Forestry	Free	
Ex 440j	Fish hooks, n.o.p.	10 percent	West Germany 0301	Fish, live or dead, fresh, chilled or frozen:		
Ex 797	Nylon fishing nets , , , ,	5 percent ad valorem but not less than kr. 2.00 per kg.			A. Fresh-water fish: ex3 - Other than salmon and trout: Eels:	
3 G. A. V.	Fish meal, other than herring meal	10 percent		From October 1 to 31 From January 1 to April 30 Other fish, not including sels and carp B. Sea fish: 1. Whole or cut up, not including fullets: ex c - Other than herring or aprati: from August 1 to December 31. Plaice and flounder.	3 percent Free 5 percent	
3 XVIII(22) (i) 3 V(5) (xix)	Fish hooks	20 percent				
3 X (1)	Fish processing machines, skinning, gutting, opening, splitting, slicing, and cutting machines; head-, tail- and bone-removing machines	17} percent			Free 6 percent	
3 G.A.V.	Carageen extract	10 percent		2. In fillets	10 percen	
Ex 12013	Fish and shellfish, not specified, dried	0,33 gourdes per kg.	0303	C-2 Oysters (other than spat)	Free	
taly 24b	Fish, simply salted, dried or smoked: codfish (baccala) or similar fish (haddock, klippfish, stockfish)	20 percent ad valorem	1004	1C. In hermetically sealed containers (canned): a. Of the salmon family d. Sprat (Clupca sprattuc) ex.s. Herring, the live length and over the continuous	20 percen 14 percen	
156	Prepared or preserved fish: in airtight containers Salmon (canned)	14 percent		in oll or tomato or both Other, in containers of a weight of more than five hundred grams	14 percen 20 percen	
1340b	Fish hooks, including anchor type	12 percent		ex f. Eel, boiled, fried, or similarly treated, with		
iustria 16 04 Ex B-1-b	Pish, cooked or smoked, in sauces, mayonnaise, re- moulade or in non-jellying liquids. Kippered herring (salted or moked herring without any addition in mirtight containers (canned).	220 schillings per 100 kgs. 150 schillings per 100 kgs.		added vinegar or aromatic herbs ex. In other packings: Fish of the salmon family Sprat, herring, in containers of a weight of more than five hundred grams Eel, bolled, fried, or similarly treated	20 percer 20 percer 20 percer 20 percer	
bbreviations: n.o.o - no			Ex 1605	Lobster, prepared or preserved	20 percer	

Note: Complete date on all tariff items negotiated in 1956 tariff negotiations and related information are contained in these U, S, Department of State publications for sale by Superintendent of Documents, U, S, Government Printing Office, Washington 25, D, C.

1. General Agreement on Tariffs and Trade--Analysis of United States Negotiations--Sixth Protocol of Supplementary Concessions, Geneva, 1956 (State Department Publication No. 6348, Commercial Policy Series No. 158), \$1.

2. General Agreement on Tariffs and Trade, Schedule XX (State Department Publication 6362, Commercial Policy Series 159), 60 cents.



SHRIMP--A FAVORITE AMERICAN FOOD

The glamorous shrimp continues to win favor with Americans.

Statistics released here April 18, 1956, by the Shrimp Association of the Americas in connection with the Eleventh Annual Convention of the National Fisheries Institute at Miami Beach, Fla., show that the United States is now consuming more than 350 million pounds (heads on) of shrimp a year, valued at \$225 million ex-vessel, an increase of about ten percent a year.

"Americans are now consuming shrimp at the rate of two pounds per capita," Manny Sanchez, Brownsville, Tex., president of the Shrimp Association declared. "Our shrimp products, once classified chiefly in the cocktail category, are rapidly moving into the main-dish area on Americans' menus.

"Sales in 1955 reached an all-time high and shrimp is now the largest single fish product in dollar volume of sales."



Frozen shrimp for the first time took a lead over fresh shrimp in consumer sales. The frozen product sales rose 21 percent last year. Frozen shrimp now accounts for 54 percent of the total shrimp volume.

Shrimp consumption in 1955 was 356.1 million pounds (heads on) as compared to 325.1 million pounds in 1954. Frozen shrimp consumption in 1955 was 191 million pounds (heads on) as compared to 157.6 million pounds in 1954. Domestic production accounted for approximately three-fourths of the total; imports for about one-fourth.

--Excerpt from address at National Fisheries Institute Eleventh Annual Convention, April 18, 1956.



FISH-QUALITY DETERIORATION STUDY

As part of a large-scale study on objective tests for quality of fish, work at the Seattle Technological Laboratory of the U. S. Fish and Wildlife Service has been concentrated on compounds formed in the meat of fish while deterioration in quality is occurring. Fish of varying degrees of freshness are being analyzed to learn what these compounds are, and how they may be evaluated in terms of the level of quality of the fish. The first group of compounds being studied are the free amino acids, liberated from the protein of the meat by enzymatic action. Results to date indicate that certain reactive compounds are freed only after definite spoilage has occurred. Changes in fish muscle constituents during earlier stages of spoilage are now being studied.



STUDY OF DRIP IN FROZEN FISH

The loss of tissue fluid from fish frozen, then thawed, has for years been a vexing problem of fish processors and users. For example, the homemaker may think she is being sold water at the price of fish when the exuded fluid appears around the thawed portion. Studies now under way at the Ketchikan laboratory are aimed at a better understanding of the chemistry involved when the meat of fish loses these fluids.

In preliminary studies designed to characterize the proteins occurring in drip, frozen fish were thawed, minced and subjected to centrifugation. The fluid separated from the meat by this process was again centrifuged, this time at very high speeds. No solid particles were precipitated from the fluid during the centrifugation. No structural (fibrous) proteins from the musculature of the fish were observed to be precipitated following a ten-fold dilution of the drip with distilled water. Continued dilution caused the precipitation of a protein fraction, and subsequently, treatment of the remaining liquid with trichloroacetic acid precipitated a second fraction.

Protein characterization studies on the drip were also made using electrophoresis, the technique whereby protein fractions are separated by their different rates of movement under electrical impulse along a strip of porous paper. Three major fractions were observed which were soluble indilute saft solutions.

Work to date indicates: (1) no solid proteinaceous particles or fibrous proteins can be found in the drip fluid from the meat of fish; (2) two major fractions of proteins, soluble in very dilute salt solutions, but differing in their solubilities in distilled water, were found to be present in the drip; (3) separation of the protein components of drip into three major groups was accomplished by taking advantage of the relative mobilities of the fractions during electrically-assisted diffusion along a strip of porous paper.

The apparent significance of the studies lies in the fact that the only protein components of drip found thus far are all soluble in dilute saline solutions corresponding to the salinity levels of the meat of the fish. As a preliminary hypothesis, it may be stated that drip from frozen and thawed fish meat contains only those proteins normally found in suspended form in the meat.



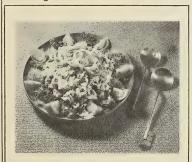
ANTIOXIDANT MIXTURES FOR PRESERVING FISHERY PRODUCTS

The possibility of increased preservation of fatty fish by the use of antioxidants is a matter of great importance to the fishing industry. Research contracted by the U.S. Fish and Wildlife Service to the University of California at Davis, Calif., has shown that mixtures of antioxidants are much more effective in preventing oxidative deterioration of food products than are any of the compounds alone. This synergistic action of antioxidant mixtures is now being tested under commercial conditions at the Fish and Wildlife Service's Seattle laboratory. Further information will be available when the tests are completed. The research is being financed with funds provided by the Saltonstall-Kennedy Act of 1954.



TUNA IDEAL FOR SUMMER PICNICS

If your family responds to your dinner call with mild enthusiasm, it is time for a change. Summertime is tuna time and also picnic time. So, why not change



the family eating routine and treat them to a pionic supper either in your backyard or a nearby park? Pionics are the occasions when you can don sports clothes and serve simple but tasty food in a relaxed and enjoyable fashion.

Of course, it's the food that makes a picnic enjoyable and the enterprising planner will give the main course extra-special attention. Canned tuna packed with energy-giving protein is aflavorful basis for main-course salads or sandwiches. It is a natural ingredient, too, as there is little or no preparation. Just open a can and it is ready to use. And, it is economical, too, as there is no waste.

The home economists of the U. S. Fish and Wildlife Service suggest that you join the summertime outdoor parade and serve "Tuna Salad" at your next picnic supper.

TUNA SALAD

 $\frac{2}{2}$ Cans (6 $\frac{1}{2}$ OR 7 OUNCES EACH) TUNA $\frac{1}{2}$ CUP MAYONNAISE OR SALAD DRESSING 1 CUP DICED CELERY 2 TABLESPOONS CHOPPED SWEET PICKLE 2 TABLESPOONS CHOPPED ONION

2 HARD-COOKED EGGS, DICED DASH PEPPER LETTUCE TOMATO WEDGES

Drain tuna and flake. Combine next six ingredients. Serve on lettuce and garnish with tomato wedges. Serves six.



Additions to the Fleet of U. S. Fishing Vessels

MAY 1956: A total of 53 vessels of 5 net tons and over were issued first documents as fishing craft during May 1956--eleven more than in May 1955, according to the U. S. Bureau of Customs. The Alaska and South Atlantic areas led with 10 each, followed by the Gulf and Pacific areas with 9 each.

Table 1 - U. S. Vessels Issued First Documents								
May 1	956 w	ith Co	mpari	sons				
		JanMay Tota						
1956	1955	1956	1955	1955				
	(1	Numbe	r)					
2	-	8	7	18				
5	3	13	8	13				
8	4	29	15	54				
10	13	24	28	65				
9	6	38	35	103				
9	13	23	39	117				
-	-	2	2	9				
10	3	22	15	35				
-	-	1	2	3				
	May 1 M 1956 2 5 8 10 9 9	May 1956 w May 1956 1955 (1 2 - 5 3 8 4 10 13 9 6 9 13 - -	May 1956 with Co May Jan. 1956 1955 1956 (Number 2 - 8 5 3 13 8 4 29 10 13 24 9 6 38 9 13 23 2	May 1956 with Compari. May JanMay 1956 1955 1956 1955 (Number) 2 - 8 7 5 3 13 8 8 4 29 15 10 13 24 28 9 6 38 35 9 13 23 39 - - 2 2 10 3 22 15				

Walla 1 II C Wassals Issued Binet Door

Total 53 42 160 151 418

Note; Vessels have been assigned to the various sections on the basis of registered home ports.

Virgin Islands . .

Table 2 - U. S. Vessels Issued First Documents as Fishing								
Craft, by Tonnage, May 1956								
Net Tons					Number			
5 to 9					18			
10 to 19					18			
20 to 29					7			
30 to 39					6			
40 to 49					1			
130 to 139					1			
170 to 179					1			
180 to 189					1			
Total					53			



Arkansas

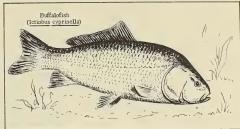
FISH AND RICE CROPS: More and more acres in Arkansas are being used to produce alternating crops of rice and fish. It has been estimated that 50,000 of approximately 1,000,000 acres of the State's rice lands are now being used for commercial fish production.

Reservoirs are an important tool in the production of each of these crops. In the rice-growing areas, the soil structure is such that little or none of the surface water will percolate to the substrata. Thus, to save this valuable water, dirt levees are thrown up to form reservoirs. These are used to flood the fields and to hold fish.

The cycle of rice and fish production is begun with the planting of rice. Water is pumped over the fields of growing rice and then is drawn off just before harvest time. After the rice harvest, the fields are flooded again and this time are planted with the desired fish species, such as carp, buffalofish, and channel catfish. At the end of two years, the fields are drained again and the fish crop is harvested. The marketable fish are sold, brood stock and surplus fish are returned to the reservoirs, and any undesirable species are destroyed.

Though buffalofish and channel catfish are considered difficult to propagate in controlled waters, the job is being done on a hit-or-miss basis. The farmers who

have been successful in producing fingerlings of these two species have a most profitable enterprise. It is reported that buffalofishfingerlings, 3 to 6 inches in length, are being sold for \$50 to \$75 a thousand. A rice grower who produced 700 pounds of buffalofish an acre over a two-year period recently sold his marketable fish and a considerable quantity of brood stock for only slightly less than he had received for his previous rice crop. To the price re-



ceived for the fish could be added, of course, the value of stored water plus fertilizer (fertilizer the water is believed to return to the soil at the rate of approximately \$20 an acre a year).

Game species produced by the rice growers are kept for sport fishing. An increasing number of reservoirs are being leased to sportfishing groups or opened to the public on a pay-to-fish basis, reports The Progressive Fish-Culturist (July 1956), a U. S. Fish and Wildlife Service publication.



California

PERIODIC FLIGHTS CONTINUED TO STUDY PELAGIC FISH DISTRIBUTION (Airplane Spotting Flight 56-4): The fourth of a series of periodic flights designed to study pelagic fish distribution, abundance, and behavior in 1956 was completed by the California Department of Fish and Game (Cessna "170" 1359D during May 7-

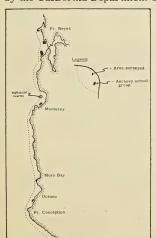
11, 1956. The inshore area from Pt. Reyes to San

Diego was surveyed.

Despite the occurrence of rain showers on May 8 and 9, an excellent coverage of the coast was made. Visibility was good and exceptionally calm weather prevailed over the entire coast.

Plankton concentrations changed considerably since the April 2-6 flight. The large areas of rich "brown" water were replaced with clearer "green" water and visibility into the water was very good. Brown water was found only in small areas in Monterey and Drakes Bays. Euphausiid swarms were present in Monterey Bay again as in April and the salmon boats, both commercial and sport, were concentrated in the area where the euphausiids were concentrated. On May 7, 59 boats, and on May 8, 135 boats were observed in the area of euphausiid swarming which extended about two miles in diameter.

Most of the fish schools observed during this flight were very close to the surface, thus permitting good identification from the air. A check with the commercial and sport boats revealed a compar-Airplane Sporting Flight 56-4 (May 7 and 8, able fish distribution and identification as was made from the air.



Anchovy: Anchovy schools dominated the inshore area over the entire extent of the coast covered. Adult anchovy schools were very numerous south of Pt. Dume

and during the three days spent in the area more anchovy schools were observed than during any previous period over the last three years. Maps were made, each covering 10 miles of coast line, to more efficiently tally the schools seen. A total of 3,039 schools of anchovies were observed from Bolinas to Coronado and 8, 132, 000 square feet of fish were tallied in each 10-mile section in which fish were seen. In addition, 550 schools of juvenile (1956 year-class) anchovies were observed in the area between San Onofre and Del Mar. These young fish were "breezing" on the surface in thin schools averaging about 3,000 sq. ft. per school. No adult fish of any species was observed near these young fish and no sea lions or birds were observed in the area feeding on the fish.

Sardine and Mackerel: No schools of sardine and mackerel were observed in the inshore area covered. Routine sampling of the commercial and bait anchovy catch revealed the presence of a trace of "eight-inch" sardines mixed in with most schools of anchovies taken. Commercial fishermen reported catches of jack mackerel at San Clem-

Area aureged.
Anthory school group.
Anthory

Airplane Spotting Flight 56-4 (May 8, 10, and 11, 1956.

ente and Santa Catalina Islands and also reported some schools of adult sardines in these areas. A sample of adult sardines taken at Santa Catalina Island revealed that the fish were in near spawning condition. In comparison with last year, the adult sardines are remaining closer to the shore during the 1956 spawning period. It was not until the first week of June that adult sardines were seen along the coast in the spring of 1955.

* * * * *

CATCH OF SHRIMP BEAM TRAWL NETS OF VARIOUS MESH SIZES STUDIED BY M/V "N. B. SCOFIELD" (Cruise 56-B-1): To compare the catch (size of individuals and total quantity) of shrimp beam trawl nets of various mesh sizes was the principal purpose of this cruise by the M/V N. B. Scofield, research vessel of the Marine Fisheries Branch of the California Department of Fish and Game. This information is to be used in making recommendations for legislation to protect the necessary numbers of spawners. Fishing was for Pandalus jordani in the Bodega Bay area. In addition, the vessel attempted to collect shrimp, (P. platyceros), with two types of experimental traps just south of Monterey, and checked on the abundance of abalones on the Farallone Islands.

A beam trawl frame 20' across with a single cross bar was used. For most net comparisons two trawl nets, each 10 feet across the mouth were hung side by side. This method cancels out the tendency of the shrimp to school by size even within the same bed. Scouting was begun off Pt. Reyes and continued northward until commercial-size catches were made just south of the mouth of the Russian River in 40 fathoms.

The experimental shrimp traps were of one basic design, but half were constructed of heavy "hardware cloth" steel mesh and the others were steel frames covered with cotton net webbing; the only bait used was fish livers in a rather bad state of decomposition.

A total of 100 drags were made with the beam trawl. Of this number 65 had enough shrimp in each net to constitute adequate samples for comparison. One



N. B. Scofield.

25-minute drag produced 1,200 pounds of shrimp. Nets of six different mesh sizes were used. These covered the spread from a mesh minimum of 0.69 inch to a maximum of 1.84 inches measured inside the knots. Exact evaluation of the results will depend on the measuring of the individual shrimp in the samples and organization of this data.

No prawns were taken in the 4 days of fishing with traps. The probable cause was improper bait. Lampreys were taken at an average of about nine per trap per setting.

The abalone exploration at the Farallone Islands was limited to one morning. Abalone are normally found in quantity only on the rougher shores, i.e. they would be expected only on the windward side of the islands. The swell was heavy enough to make it impossible to get in close enough to dive, let alone to do any actual diving. Instead dives were made in three places in the lea of the islands. Abalone were quite scarce, as was expected.



Cans--Shipments for Fishery Products, January-April 1956



Total shipments of metal cans during January-April amounted to 39, 330 short tons of steel (based on the amount of steel consumed in the manufacture of cans) as compared with 23, 881 tons in January-April 1955. The increase in January-April 1956 probably reflects the heavier pack of canned tuna as compared with the January-April 1955 period. Packs of other fishery products are usually light during this period of the year.

Note: Statistics cover all commercial and captive plants known to be producing metal cans. Reported in base boxes of steel consumed in the manufacture of cans, the data for fishery products are converted to tons of steel by using the factor: 29,0 base boxes of steel equal one short ton of steel.

Electronic Devices Utilized in Fishery Research and Management

Unwittingly and involuntarily the fish has "gone electric."

An electric fence has been used successfully by the U. S. Fish and Wildlife Service to keep the big Kodiak bear away from critical sections of salmon streams.

Electrical weirs protect fish by jolting the life out of sea lampreys on their way to spawning grounds to bring forth more lampreys to prey on more fish.

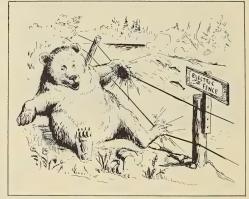
A "tattletale" electronic device, called a sonic tracker, is being attached to the back of salmon and for as much as 100 hours every twist and turn of the fish is flashed to a recording instrument on land or in a boat. Fish count themselves when passing through another device created by the Fish and Wildlife Service and at times the fish take their own pictures.

Fish protection at powerplant intakes by use of electrical fish screens is being studied by the Fish and Wildlife Service, while in other places fish are being

spotted for harvesting by any one of severalfish finders which have been developed by electronic specialists.

An underwater telemeter which indicates the depth of nets has solved one of the problems of midwater trawling. Underwater television is telling the Fish and Wildlife Service more about fish in their regular habitat and more about what could be done to make fishing gear more efficient and effective.

Fish "shockers" are used to temporarily "knock out" fish in a stream to permit stream population counts.



Besides these, there are the fathometers used to measure ocean depths, radar and electrical beams and direction finders to guide ships and planes, and radio for communications.

All of these devices the Fish and Wildlife Service uses--some, like the fish counter, the Fish and Wildlife Service created; some, like the sonic tracker and underwater telemeter, electronic specialists created at the behest of the Fish and Wildlife Service; others, such as the fish finders and the underwater television, other sources created and developed and the Fish and Wildlife Service adapted for it use.

Three of these devices—the electric fish counter, the sonic tracker, and the fish-guiding apparatus—apply particularly to salmon studies but can be used on other species of fish as well. In fact, considerable interest has been shown in the fish counter and in the guiding device by many state fish and game departments. The sonic tracker is too new to elicit widespread comment yet.

The sonic tracker is to be used to study the passage of fish through fishways. The initial studies will be made at Bonneville Dam on the Columbia River where the Service has the facilities to observe fish behavior in several types of fishways. By being able to chart the reactions of salmon to various types of fishways, Service technicians hope to be able to determine the most effective fish-ladder design.

The sonic tracker is a capsule about 2.5 inches long and less than an inch in diameter which is fastened to the back of a salmon just to the rear of the dorsalfin. Studies show that the fish's reactions are normal about five seconds after the tracker is attached. It contains a 15-volt battery and other transmitting apparatus capable of sending signals for a period of time varying from 10 hours to 100 hours. The signals can be detected as far as 2,000 feet under ideal conditions. A fish carrying the capsule can be tracked and its position pinpointed for about 800 feet in clear still water and for about 100 feet in rough, turbulent streams. The receiver which automatically registers the movements can be placed on shore or installed in a boat. Sound waves may be varied so that movements of as many as ten fish can be traced at the same time.

The chief value of the electric fish counter at present is to test the effectiveness of the fishways as well as to register the number of salmon heading for the spawning grounds. The continuance of a salmon fishery depends to a great extent upon a sufficient number of adult fish reaching the spawning area. The practice of making visual counts at fish ladders and in streams has not been entirely satisfactory.

The counting device is fully automatic, not only counting the fish and indicating the size and direction of travel, but, through the medium of an underwater camera, it can identify the species of fish. The counter can also be adjusted merely to sound a signal when a fish goes past, thus alerting a watcher to his task. It is also possible to have the dial, which registers the fish, installed in an office or at some other point some distance from the stream. Indications are that this instrument, when fully developed, will be used in many parts of the Nation where fish runs are important and in many places where fish counts are needed.

Numerous techniques in screening young fish from water diversions have been tried with varying degrees of success. Since the power turbine and some of the big irrigation diversions offer a major threat to young fish, especially salmon on their way back to the sea, the Fish and Wildlife Service has done considerable research on mechanical and electrical methods of meeting the problem. Considerably more research is necessary along this line.

In small experimental streams these devices have been about 95 percent successful in guiding the fish into the desired places. Testing is now being done on large streams. Two methods have been used, one based on the fact that fish are attracted to the positive pole. The other is based upon the principal of repulsion of fish by an electrical field.

The sea lamprey weir is an electrical barrier placed across a stream used by the lamprey for spawning. The weir is an apparatus of charged electrodes which sets up an electrical field which kills any sea lamprey attempting to pass through it. The weirs are installed in streams tributary to the Great Lakes in cooperation with the respective state fish and game departments. The sea lamprey which entered the upper Great Lakes about 20 years ago has destroyed the lake trout fishery of Lake Michigan and Lake Huron and has now appeared in Lake Superior. Its control is a major objective of the Service and allied agencies.

The underwater telemeter is a device which indicates the exact distance of the trawl or net below the surface of the water. Its use will aid considerably in increasing the efficiency of midwater ocean commercial fishing, especially the exploratory work which will be necessary to determine the fishery values of the midwater area. Comparatively little midwater fishing has been done by United States fishermen, who have concentrated on surface and bottom fishing.

The Fish and Wildlife Service has two underwater television units. One of these is at the Gear Research Laboratory at Coral Gables, Fla., and the other is at the Fishery Laboratory at Woods Hole, Mass. At Coral Gables, the television has permitted close scrutiny of fishing gear in actual operation under water. It is expected that this research will result in many improvements in the efficiency of commercial fishing gear. At Woods Hole, biologists are more concerned with the effect of fishing gear upon fish which are too small for market. The sizes of fish which will escape through the meshes of trawls will be studied, as well as the manner of escape and behavior within the net, so as to determine methods of saving small fish from destruction. Biologists will also make various studies of the ocean bottom and the small marine animals which inhabit the bottom and serve as fish food.

In order that underwater television might be better utilized, the researchers at Coral Gables have developed an electrically-controlled vehicle which permits the manipulation of the camera under water.

The use of the electric shocker in making fish population studies has been an accepted practice for years, but recent adaptations made by the State of New York under a Federal-aid project now makes the shocker effective in soft water, thereby extending its usefulness into many areas.

The electric fence protects the spawning salmon from the bears. Generally speaking Kodiak bears can go any place they desire to go but a few brushes with the fence had a very salutatory effect upon the big fellows. This experiment has been in operation for about three years.

Thus electricity and electronics play a major role in the life of fish, protecting them from harm until such time as they become useful to man, at which time it swings against the fish and over to man, as attested by such devices as fish finders and the electric range.

Federal Purchases of Fishery Products

FRESH AND FROZEN FISHERY PRODUCTS PURCHASED BY THE DEPARTMENT OF DEFENSE, MAY 1956: The Army Quartermaster Corps in May 1956 purchased 2,715 pounds (valued at \$1,322,000) of fresh and frozen fishery products for the use of the U. S. Army, Navy, Marine Corps, and Air Force. This was 48 percent more in quantity and 58.9 percent more in value than purchases the previous month and 26.9 percent more in quantity and 43.4 percent more in value than purchases in May 1955.

Purchases of fresh and frozen fishery products during the first five months of 1956 totaled 9,494,000 pounds (valued at \$4,855,000)--12.3 percent less in quantity but 4.6 percent more in value than purchases for the same period a year ear-

Purchases of Fresh and Frozen Fishery Products by										
Department of Defense (May and the First Five										
Months of 1956 with Comparisons)										
	QUAN			VALUE						
	ay	Jan.		May Jan May						
1956	1955	1956	1955			1956				
		Pounds)				000)				
2,715	2,139	39 9, 494 10, 825 1, 322 921 4, 855 4, 639								

lier. This indicates that this year the purchases consisted of higher-priced products.

Prices paid for these fishery products by the Department of Defense in May averaged 48.7 cents a pound as compared with 45.3 cents

a pound the previous month and 43.1 cents a pound in May 1955.

In addition to the purchases of fresh and frozen fishery products reported, the Armed Forces generally make some local purchases which are not included in the data given above. Therefore, actual purchases are somewhat higher than indicated, but it is not possible to obtain data on the local purchases made by military installations throughout the country.

* * * * *

QUARTERMASTER CANNED SALMON REQUIREMENTS FROM 1956 PACK: Tentative requirements for a group of canned food items from the 1956 pack to meet the needs of the Armed Forces were announced June 28 by the Department of Defense. Included in the requirements are 5, 201, 000 pounds of coho or medium red



salmon packed in No. 1 tall cans. These estimated requirements are subject to modification and are listed to aid industry in planning 1956 production. Procurement will be effected by the various Market Center offices of the Army Quartermaster Market Center System, with headquarters at 226 West Jackson Blvd., Chicago 9, Ill.



Films

FISHERY FILMS SELECTED FOR INTERNATIONAL FILM FESTIVAL: Four new documentary motion pictures produced by Interior Department agencies in coperation with private industry are among the eight United States Government films selected for showing at the 1956 Film Festival in Edinburgh, Scotland, in August

and September, Secretary of the Interior Fred A. Seaton announced June 29. The film festival is part of the International Festival of Music and Drama in which about 25 nations participate annually.

Two of the chosen entries were produced under the supervision of the Fish and Wildlife Service, and two under the Bureau of Mines. This is the second time this honor has been won by the Fish and Wildlife Service.

Boats, blue water, and seafood fit for a king but within reach of all are featured in the Fish and Wildlife Service pictures. The films, all in 16mm. color



Maine lobsterman. A scene in the film Outboard Fisherman U.S.A.

and sound, and the names of the private industry sponsors are:

Outboard Fisherman U.S.A., financed by the Outboard, Marine and Manufacturing Company of Milwaukee, Wis., makers of outboard motors. It shows how the rugged, small, independent commercial fisherman, using outboard motors, contributes to the national economy. Scenes from 10 areas in the United States and Alaska show the catching of 10 different species of fish and shellfish using various colorful fishing techniques.

Shrimp Tips from New Orleans, financed by The Peelers Company of that cosmopolitan city, manufacturers of shrimp processing equipment. The film reflects, in its unusual style of cooking, music, and architecture, the people from many countries who settled there. Six shrimp recipes are cooked and served in typical New Orleans atmosphere showing the influence of various countries upon New Orleans culture.

The other two Interior Department films selected are <u>The Petrified River-The Story of Uranium</u> and <u>Arizona and its Natural Resources</u>.



A scene in the film Shrimp Tips from New Orleans.

These films may be secured on a loan basis without charge, although only one, Arizona and its Natural Resources, is available at the present time. The other three will probably be ready for distribution before September.

Each year the United States sends Government and non-Government films to the Edinburgh Festival. The American Government films are selected by the Interdepartmental Committee on Visual and Auditory Materials for Distribution Abroad. This committee, in turn, works through subgroups, one of which is the Subcommittee on Motion Pictures.

The Committee is now considering the selection of exhibits to the International Exhibition of Cinematographic Art which will be held in Venice, Italy, after the Edinburgh Festival.



Fish and Wildlife Motif on United States Postage Stamps

The second (pronghorn antelope) of the three stamps being issued to emphasize the importance of Wildlife Conservation in America was released at Gunnison, Colo., on June 22, 1956, the Post Office Department announced on April 23. This special 3-cent stamp was first placed on sale on the occasion of the annual convention of the

Colorado Division of the Izaak Walton League. The first (wild turkey) stamp in this series was issued at Fond du Lac, Wis., on May 5, 1956.

The pronghorn antelope, which is the subject of this issue, is an outstanding example of the conservation work being carried on by the Federal and State Governments. Antelopes have been protected, studied, and transplanted under scientific guidance so that their numbers have increased from a low of 17,000 to herds large enough to allow hunting in five Western States.



The design of this stamp portrays a buck and two does of the pronghorn antelope species in their natural habitat,

The stamp is 0.84 by 1.44 inches in dimension, arranged horizontally with a single outline frame, printed by the rotary process, electric-eye perforated, and issued in sheets of 50.

Note: Also see Commercial Fisheries Review, April 1956, p. 13.



Fish and Wildlife Service

NEW RESEARCH LABORATORY TO STUDY PROBLEMS OF GULF FISHERIES: Problems related to finding, catching, and processing Gulf of Mexico fish and shell-fish will be tackled at the new U. S. Fish and Wildlife Service fishery laboratory to be constructed this year at Pascagoula, Miss., Secretary of the Interior Fred A. Seaton announced July 18.

Contract for the construction of the new laboratory and auxiliary buildings has been awarded to the Oden Construction Company of Hattiesburg, Miss., for \$165,000. Engineers of the Service's Regional Office in Atlanta, Ga., will exercise general supervision of construction. In addition to the fisheries research building, there will be a net facility and a smaller structure to be used for fishing gear fabrication.

Research on methods and techniques for providing the highest quality pack of shrimp, oysters, tuna, and other south Atlantic and Gulf seafoods will be one of the main tasks of the new laboratory. Heretofore technological work for the Gulf and south Atlantic areas was handled through the Service's laboratory at College Park, Md.

The new installation will provide facilities for the exploratory fishing and gear development program now being conducted in the Gulf area. The Service's exploratory fishing vessel <u>Oregon</u>, which operates in the Gulf of Mexico, is based at Pascagoula in connection with this program.

Office space also will be furnished in the new laboratory for local personnel engaged in statistical work and the educational and market development programs.



Florida

FISHERIES RESEARCH, JANUARY-MARCH 1956: The following are some excerpts from the Quarterly Report on Fisheries Research, March 1956, of The Marine Laboratory of the University of Miami.

Mullet Marketing Study: As part of the program to expand demand for mullet, an experimental smokehouse was built. Inquiries were made on the possibility of creating a market for mullet in Milwaukee for smoking. Locally-smoked mullet were taken to Milwaukee to demonstrate the quality of the product and several hundred pounds of fresh



and frozen mullet were shipped to Milwaukee and smoked there by a large commercial smoker. The smoked mullet were introduced through the regular channels of distribution. Use of mullet for this purpose will depend on solving problems of price and low yield after cleaning.

Questionnaires were mailed to several hundred institutions in the southeastern United States to determine their buying habits. An analysis of their answers will be presented to dealers so they can better cultivate this market for Florida seafoods and increase demand for their products.

Shrimp Technology: BLACK SPOT: (1) Further experiments were carried out to determine the degree of thiamine destruction and amount of residual SO2 in shrimp treated with sodium bisulphite at levels which offer adequate protection against black spot. Two series of tests consisting of a total of 36 analyses showed no significant differences in the amount of thiamine between the bisulphitetreated and control shrimp samples. The SO2 residual was from 22 to 65 times lower than in dried fruit of well known brands. A high degree of thiamine destruction and high amounts of residual SO2 were the major objections to the use of bisulphite in shrimp that were anticipated from the U.S. Food and Drug Administration. Now that these potential objections have been removed, the way is paved for an application for the necessary approval from the Food and Drug Administration for the use of bisulphite in shrimp. The necessary brief has been prepared.

(2) Frozen shrimp obtained from a wholesale source were-thawed and then stored in flake ice containing 0.1 percent sodium bisulphite. This

preliminary experiment indicated that the rate of black spot formation can be reduced using the bisulphite flake ice. Further experiments are to be carried out.

(3) Field trials were conducted with butylated hydroxy toluene antioxidant ice in Tampa. Fifty tons of this ice were prepared. Due to an unforseen delay in the departure of the fishing vessel, the ice had to be stored for about one week at 10° F. As a result, it was supercooled upon loading aboard the vessel. The greatly reduced chilling and bathing effect due to the lower melting rate of the ice caused a high amount of black spot and spoilage. It is planned to repeat the test.

ANTIBIOTIC ICES: The degree of uniformity in which aureomycin is distributed in the ice was studied. Twenty-eight analyses were run on aureomycin ices in which seven different combinations of carrying agents were used. Carrageen was superior to high viscosity carboxymethylcellulose and to methylcellulose. The main objection to the use of the carrageen (SeaKem 9) carrier is that it contains calcium ions which catalyze the black spot reactions.

SPOILAGE DETERMINATION TESTS: Chromatographic analyses of the animo acids in shrimp were started. The object of this study is to determine whether and what type of relationship exists between the degree of spoilage of shrimp and the quality and quantity of certain amino acids present. It is hoped to use such a relationship as an indicator of recipient spoilage in shrimp.

SMALL SRRIMP STUDIES: It has been stated that "size of mesh does not control to any marked degree the size of shrimp caught." This is not true, as experimentation in North Carolina and now by ourselves has shown.

Tortugas experiments: objectives: (1) to get data on seasonal changes in average size of shrimp on the fishing grounds; (2) to get data on area differences in average size of shrimp on the fishing grounds; (3) to find average size of shrimp retained and escaping through cod ends of various mesh sizes; (4) to standardize mesh-measuring techniques and determine shrinkage characteristics of cod ends; (5) to relate length data to commercial "count" (weight) categories.

Procedures: boat: Manboy out of Key West, 110' single-screw; 170 hp. engine. Cruises 8.5 knots, fishes 3 knots (9' x 3'4" boards).

Objective is not to see how many shrimp can be caught, but only to see what sizes are caught. Also, to compare what goes through the cod end meshes with what is retained in the cod end.

Fishing is done on two successive nights during the first two weeks of each month. Three hauls are made each night of two hours duration, covering about $6\frac{1}{2}$ nautical miles each. The first three hauls are made due west from a point about 4 miles north and $8\frac{1}{2}$ miles west of the Wreck Buoy. The second three hauls are made to the east, parallel to the first series, starting at the easterly end of

the area trawled the first night and 4 miles south of it. The area includes a depth range of from 13 fathoms to 17 fathoms.

The net is a 100' Florida flat trawl. The cover is untarred cotton of 1' stretched mesh when new and dry (less due to shrinkage). It is attached about 12 meshes below the beginning of the cod end. It trails about 4-5 feet past the end of the cod end.

The net is fished exactly as a commercial net would be. When the net comes aboard the cover net is opened and its catch is put aside. Then the cod end is opened. Estimates are made (1) of the weight of the total (shrimp and trash); (2) of the trash; (3) shrimp; (4) finfish, shell and sponge. Note is made of the proportion of shrimp still alive in the cover bag.

A known proportion of the total catch is then spearated. The shrimp are separated from the trash, headed, and the heads preserved for measurement. The rest of the catch is headed and sold.

At the conclusion of each haul, surface and bottom salinities and surface and bottom temperatures are recorded. Certain weather data are recorded.

The shrimp are measured by taking the length of the cephalothorax (head) between the notch in the eye socket and the far end of cephalothorax. These were converted to count sizes by actual observations.

Meshes were measured on the nets used. Considerable shrinkage occurs after soaking, reducing the average mesh size 10-20 percent.

Three cod ends with mesh sizes of $1^{\frac{34}{4}}$, 2^{u} , and $2^{\frac{1}{2}}$, but otherwise identical to gear used commercially, were used. The $2^{\frac{1}{2}}$ is not in commercial use.

The different size meshes caught different sizes of shrimp. The data obtained shows the percentages of various sizes of shrimp caught by the 3 mesh sizes, comparing 70 count and smaller shrimp, 31-60 count, and 30 count and larger shrimp. They show that 43 percent of the shrimp caught in the $1\frac{3}{4}$ " mesh net were smaller shrimp (less than 70 count), 48 percent were medium size (31-60 count), and 9 percent were large shrimp (over 30 count). In the 2" net, 38 percent were small, 54 percent medium and 8 percent large; in the $2\frac{3}{4}$ " net, 16 percent were small, 75 percent medium and 10 percent large. Thus the small-meshed net was catching more smaller shrimp than the other two.

The 1½" net catches practically all the shrimp on the grounds; 98 percent of the small shrimp and all the medium and large shrimp. The 2" net catches less of the small shrimp-91 percent, but nearly all the medium and large shrimp. The 2½" mesh caught slightly less than half (49 percent) of the small shrimp, 77 percent of the medium, and nearly all of the large shrimp.

Hence the ability of nets of different sizes to catch shrimp of different sizes is unquestionable.



Great Lakes

ELECTRICAL WEIRS TO CONTROL SEA LAMPREYS MUST REMAIN IN OP-ERATION EIGHT YEARS: The Great Lakes sea-lamprey control program discovered recently that electrical weirs now in operation on major streams must remain in operation at least 7 to 8 years and possibly longer to be effective.

Sea lampreys stay in the Great Lakes as fish-killing adults at least one year, then migrate up inland streams and lay their eggs in gravel beds. The eggs hatch soon after and the young spend their larval stage in mudbanks.

Formerly, it was thought this larval stage lasted four years before the young moved downstream for their rampaging period of Great Lakes fish destruction.

But continuing research by the U. S. Fish and Wildlife Service and the Michigan Conservation Department's institute for fisheries research first showed this

Tarval stage to be not 4 years, but 5 years, then at least 6, now "at least 7 to 8 years and possibly longer."

In short, it means that electrical weirs now in some streams must be in operation at least this length of time to halt all possible spawning lampreys and put an effective check on the predator.

Such complete control through use of weirs, fisheries workers admit, may be very difficult, even impossible.

The information places new emphasis on the only other presently-known method of controluse of chemicals to kill larvae lying in upstream mudbanks.



Electrical control device of the 2-line suspension type. This device was installed by the Fish and Wildlife Service on the Ocqueoc River, a tributary to Lake Huron, Traps for fishes and sea lampreys are located on either bank of the stream,

Two chemicals are known to kill the young larvae without damage to fish life. These chemicals recently were discovered at the Fish and Wildlife Service research station near Rogers City, but both presently are unavailable in commercial quantities and production would be costly, a Michigan Department of Conservation news bulletin points out.



Great Lakes Fishery Investigations

FISHERY STUDY OF SAGINAW BAY INITIATED BY M/V "CISCO" (Cruise 1): This cruise (June 3-11) of the Cisco initiates an intensive hydrographic and fishery study of Saginaw Bay that will be continued until late November 1956. Primary objectives of the study are to determine the composition and condition of fish stocks in the Bay and to establish the physical, chemical, and biological factors that may influence or regulate these populations.

One hydrographic transect was made between Harbor Beach and East Tawas extending "dog-leg" fashion out into Lake Huron. A second transect was made from

East Tawas to Bay City. Complete hydrographic data (plankton, light penetration, Nansen-bottle cast, and vertical temperatures) were obtained at three points on the first transect and at two locations on the second. A thermal profile of each transect was obtained from bathythermograph casts made at 5-mile intervals, and from a continuous record of surface temperature. Drift bottles were released at regular intervals along each transect to explore water movements in and near the Bay. These transects will be run and similar data collected during each cruise this year. Detailed descriptions of the operations will not be made in subsequent cruise reports.

The vertical distribution of fish in deeper water at the northeast end of Saginaw Bay (off East Tawas) was explored by fishing gill nets set obliquely from the surface to the bottom. The catch in nets set in 13 fathoms indicated a fair concentration of large bloaters (Leucichthys hoyi) near the bottom, and a scattering of yellow perch (Perca flavescens) and smelt (Osmerus mordax) at midlevels. The catch was extremely light at 26 fathoms. Only one lake herring (Leucichthys artedi), two bloaters, and two smelt were taken. Nets will be fished at these locations throughout this summer and fall to learn if this may be the area occupied by the walleye (Stizostedion v. vitreum), lake herring, and smelt during the period when they "disappear" from the fishery in Saginaw Bay.

The temperature of Lake Huron was low with a minimum recorded surface temperature of 4.3 °C. (37.7 °F.). Thermal stratification in the open lake was slight to absent. In Saginaw Bay stratification was more pronounced but the epilimnion extended to the bottom except in the deepest basins. Surface water temperatures in the Bay were high, with the highest temperature (24 °C., 75.2 °F.) recorded in the shallow southwest end.

A cooperative study with the Michigan Institute for Fisheries Research was begun on June 7. Two Service vessels, the <u>Cisco</u> and the <u>Musky</u>, and a Michigan patrol boat made two transects each across different sections of Saginaw Bay, taking a total of 51 bottom samples, releasing 350 drift bottles, and taking many water samples, plankton samples, and surface and subsurface water temperature readings. Several bottom cores were also obtained. The transects were spaced so that a reasonably accurate picture of Saginaw Bay bottom fauna, bottom types, water chemistry, and temperatures and currents could be obtained. Similar transects will be run again in midsummer and in the fall. It is hoped that the data might reveal some reasons for the striking changes in fish composition which have taken place in Saginaw Bay in recent years.

* * * * *

CHUB POPULATIONS IN LAKE HURON STUDIED BY M/V "CISCO" (Cruise 2): In order to determine the composition and condition of the chub populations, the Service research vessel <u>Cisco</u> extended this cruise (June 19-July 2, 1956) from Saginaw Bay into Lake Huron. Commercial exploitation of the chubs in Lake Huron has been resumed during the past two years. This fishery has become increasingly important with the decrease in size and quality of chubs from Lake Michigan.

Nylon gill nets $(2\frac{1}{4}-,2\frac{1}{2}-,2\frac{3}{4}-,3-,$ and 4-inchmesh) were set on the bottom in 25 fathoms off Harbor Beach and in 50 fathoms in midlake between Harbor Beach and Goderich to sample the chub population. The shallow set contained practically all bloaters (<u>Leucichthys hoyi</u>). The deeper nets made a good catch of large longjaws (<u>L. alpenae</u>) and also took several <u>L. kiyi</u>, <u>L. zenithicus</u>, and <u>L. reighardi</u>. The catch of <u>L. reighardi</u> was especially interesting since this species has not been recorded previously from Lake Huron. Preliminary comparisons indicate that these chubs are consistently larger than those taken in the same nets during <u>Cisco</u> operations in Lake Michigan.

Oblique gill-net sets in 13 and 26 fathoms off East Tawas were repeated during this cruise to establish the vertical distribution of fish at the lakeward end of Saginaw Bay. Only one fish (a bloater) was taken in the deeper set. There were a few

bloaters scattered throughout the shallow set, except near the surface. A bull net (300' long, 120 meshes deep, $2\frac{1}{2}$ -inch mesh) was set over a 13-fathom bottom with the floatline 6 feet beneath the surface. This net took 11 alewives (Pomolobus pseudoharengus), 2 yellow perch (Perca flavescens), and 1 smelt (Osmerus mordax).



Trawling was attempted in 8, 6, 4, and $2\frac{1}{2}$ fathoms for the first time in Saginaw Bay, but much difficulty was encountered in locating good bottom for this work. The catches were entirely yellow perch and forage fish.

Hydrographic transects from Bay City to East Tawas, East Tawas to Harbor Beach, Harbor Beach to Goderich, East Tawas to Oak Point, and Hat Point were completed this cruise. Standard operations completed on transects were described in the report of cruise 1.

Surface water temperatures ranged from 7.0°C. (44.6°F.) to 23.1°C. (73.6°F.). The water is thermally stratified in all but the very shallowest areas of Saginaw Bayt

A night study on vertical migration of $\underline{\text{Mysis relicta}}$, an important fish-food organism, was made in 25 fathoms off East Tawas. Some $\underline{\text{Mysis}}$ reached the surface about two hours after sunset, but many of them appeared to descend shortly thereafter, probably influenced by a bright moon.



Gulf Exploratory Fishery Program

DEEP-WATER RED SHRIMP COMMERCIAL POTENTIAL BEING EXPLORED M/V "OREGON" (Cruise 39): A total of seven days of round-the-clock fishing yielded a catch of approximately 2,700 pounds of red shrimp (heads off) that averaged 26-30 count, the Service's exploratory fishing vessel <u>Oregon</u> reported on its



M/V Oregon Cruise 39 continued to explore deep-water red shrimp potential in the Gulf.

return to Pascagoula on June 26. The vessel returned from a two-week cruise to the southeastern and northeastern Gulf. The principal objectives of the trip were to obtain information on the commercial production potential of deepwater red shrimp (Hymenopenaeus robustus) in two areas of promise discovered during previous Oregon fishing, and to obtain iced and frozen samples of red shrimp for technological studies. The fishing on this trip was carried out with 80-foot balloon and 100-foot flat trawls. Individual drags were of 2- to 4-hour duration.

Highest catch rates were obtained west-southwest of Dry Tortugas in depths

of 210 to 220 fathoms. Catches ranged from 50 to 490 pounds and averaged 225 pounds of heads-on shrimp per drag. Three days of fishing between $83^{\circ}06^{\circ}$ W. and $83^{\circ}35^{\circ}$ W. caught a total of 3,145 pounds of heads-on red shrimp. In addition, catches in this area included from 1 to 45 pounds of an unidentified species of large (21-25 count, heads on) striped shrimp. Only one of the 15 drags resulted in serious gear damage.

Four days of fishing operations were conducted in depths of 200 to 250 fathoms between the Mississippi Delta and off Mobile. One day of test dragging was needed to locate optimum fishing depths (240-250 fathoms). The 14 successful drags made during the next three days caught from 61 to 224 pounds of heads-on red shrimp, and averaged 130 pounds per drag. A total of 2,055 pounds of heads-on shrimp were caught in this area. One trawl was damaged due to bogging.

Three drags were made southwest of Tampa in 210 to 215 fathoms. Sixpounds of red shrimp were taken in one of the hauls. One of the trawls was lost.

<u>Penaeopsis</u> <u>megalops</u> (a smaller deep-water shrimp) were mixed in the red shrimp catches in all areas fished. The largest catch was made south of Mobile in 210 fathoms. The heads-on count of this species varied from 45 to over 60 a pound.

The <u>Oregon</u> was scheduled to depart Pascagoula on July 17 to carry out eight days of experimental tuna long-line fishing in the north-central Gulf area. The primary objectives of this cruise were to obtain additional information on the depth limits of yellowfin tuna stocks, and to obtain tuna samples for technological study.

Eight 50- to 100-basket sets were to be made, in each of which 10- to 20-basket units were to be set in 25- to 50-fathom depth intervals, from the surface to depths of 200 fathoms.

A series of different size groups of yellowfin tuna were to be subjected to a variety of handling methods (bleeding, chilling at various time intervals after landing, dry and brine freezing, etc.) and samples were to be frozen for laboratory studies on meat discoloration by the Service's Technological Section.



Food Irradiation Sterilization Pilot Plant

The three most suitable sites for a proposed multimillion-dollar Federal pilot plant for research and development of techniques for irradiation sterilization of foods will be selected by a committee of five civilian scientists. The Maine sardine industry's research director Dr. Berton S. Clark has been named to sit on this committee. Dr. Clark, on July 11, accepted the non-paying assignment at the request of the United States Quartermaster General and the National Academy of Sciences, reports a news release from the Maine Sardine Industry.

A government committee will suggest 10 sites as the result of preliminary screening and the civilian committee will review and evaluate the data and select the three best possibilities.

Dr. Clark, whose home is in Oak Park, Ill., is a former research director for the American Can Company and entered the employ of the sardine industry two years ago to head up a technological research and quality-control program. His headquarters are at the University of Maine.



Maine Sardines

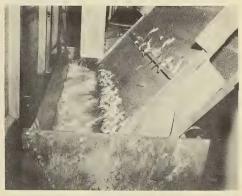
CANNING COSTS INCREASE: Maine sardine canners, now working on the new season pack, have been told to expect greatly increased production costs over the 1955 season, a June 7 Maine Sardine Industry news release announces.

A raise in the minimum wage as set by Congress from 75 cents to \$1.00 an hour plus boosts in oil, cans, cases, salt, and freight all adds up to a substantial

figure. Volume as it affects general overhead of individual packers will have considerable bearing on the ultimate cost picture, but under any circumstances the increases will be the highest for any single year in the history of the industry.

This disturbing situation was outlined for the packers June 7 by a Rochester, N.Y., auditing firm, which has been employed by the group to conduct an industrywide cost-accounting program for the past two years.

A schedule of the increases as they apply to the standard 100-can case of keyless and key-opening oil-type, which are the principal items packed, was supplied



Washing dressed herring in a Maine sardine cannery.

by the firm as follows: direct labor up 15 percent; indirect labor up 10 percent; oil up 21 percent; cans up 8.7 percent; cases up 5.5 percent; salt up 5 percent; and freight up 6 percent.

In releasing the report the industry's Executive Secretary stated that with the new round of increases it was now costing Maine canners about \$2.00 a case more to pack keyless and \$2.50 more to pack cans with keys than it did in 1950 and nearly triple the 1933 figure.

"Naturally every cost increase makes our position in the food business all the more competitive, but we are still able to offer sardines at a price to the consumer that makes them one of the best buys on the market," the Secretary added.

He said that although selling prices varied during the past year they did not always reflect a realistic cost figure and that on numerous occasions and for many reasons shipments were moved at a loss to the canners.

* * * * *

<u>CANNED STOCKS</u>, <u>JUNE 1</u>, <u>1956</u>: Distributors' stocks of Maine sardines amounted to 160,000 actual cases as of June 1, 1956, a decrease of 108,000 cases

Canned Maine SardinesWholesale Distributors' and Canners' Stocks, June 1, 1956, with Comparisons											
Type	Ilmit	1955/56 Season				1954/55 Season					
-JPC		6/1/56	4/1/56	1/1/56	11/1/55	7/1/55	6/1/55	4/1/55	1/1/55	11/1/54	
Distributors' Stocks	1,000 actuál cases	160	268	326	354	235	n.a.	331	n.a.	n.a.	
Canners' Stocks	1,000 std. cases1/		152	475	625	723	575	715	1,239	1,410	
1/ 100 3 doz, cans equal one standard case. n.a not available.											

(40 percent) from April 1, 1956. Stocks on June 1, 1956, were 166,000 cases less than January 1, 1956, according to estimates based on the results of a series of measurements for the 1955/56 marketing season by the U. S. Bureau of Census.

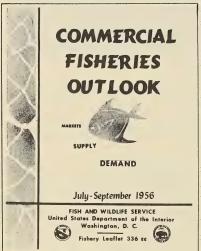
Canners' stocks as reported by the Maine Sardine Industry totaled only 64,000 cases ($100-3\frac{1}{4}$ oz. cans) on June 1, 1956. Canners' stocks for the same month in 1955 amounted to 575,000 cases and on January 1, 1956, totaled 475,000 cases.



Market Outlook for Fishery Products

JULY-SEPTEMBER 1956: The third quarter--peak production period for United States fisheries--will see a good catch of halibut, a good seasonal take of shrimp, opening of the oyster season, and the marketing of increasing supplies of canned tuna, Alaska salmon, and Maine sardines, according to the Commercial Fisheries Outlook, July-September 1956, issued July 17 by the U S. Fish and Wildlife Service.

Already the tuna catch is 50 percent above the midyear mark of 1955 and the tuna pack is up 44 percent. Halibut fishermen are making catches which should



bring the halibut harvest this year somewhat above that of last year. While shrimp fishing has been at a seasonal low, it is now going into a period of peak production and unless adverse weather conditions hamper the fishermen the shrimp catch this year should be about normal.

The tuna industry is already making plans to market its big catch and pack. A big promotional campaign, in which the industry and the U. S. Fish and Wildlife Service will join forces, has been planned and the period September 13-22 has been designated as National Tuna Week.

The new pack of Alaska salmon will make its appearance on the American market in mid-August. Indications are that the total salmon pack this year will be about the same as that of 1955 which was below average. Landings of Columbia River and Alaska king (chinook) salmon have met with a ready market, whether the salmon was fresh or frozen. The early Columbia River chinook salmon pack was quickly sold.

The Maine sardine industry got off to a slow start in June but most of the activity in that fishery is in this summer quarter. Historically the even-numbered years have been the big productive periods. Production of California sardines will begin in the fourth quarter.

Groundfish landings are expected to maintain the high level of the second quarter, although there will be a reduction in the catch of cod. Haddock stocks are about 25 percent greater than they were a year ago. Ocean perch landings which have been down somewhat are expected to increase.

Fresh-water fish landings have passed their seasonal peak.

Soft-clam production was low in Maine but the surf-clam harvest is 50 percent above the 1955 mark in the Middle Atlantic States. Hard crabs are plentiful in the Gulf and production is expected to reach a seasonal peak in Chesapeake Bay during this quarter. The oyster season on the Atlantic Coast opens in September. Sea scallops will reach a production peak in July and August.

There will be increases in the output of fish oil and fish meal and the year's output of each is expected to be about the same as that of last year, which set a record high.



North Atlantic Fisheries Exploration and Gear Research

SMALLER CATCHES OF DEEP-WATER OCEAN PERCH MADE AT EDGE OF CONTINENTAL SHELF BY "DELAWARE" (Cruise 20): Five one-hour tows in deep water at the edge of the Continental Shelf in the vicinity of Sable Island, Nova Scotia, yielded ocean perch catches ranging from 5,000 to 8,000 pounds per one-hour tow

during cruise 20 (May 21-June 2) of the Service's exploratory fish-

ing vessel Delaware.

The objective of the trip was to check the availability at this season of the year of ocean perch in deep water at the edge of the Continental Shelf.

Tows during this trip were made in areas which had produced large catches of ocean perch on a previous cruise, up to 20,000 pounds a tow.

A total of 30 one-hour tows was made, in the 150- to 350-fathom depth range. The greatest catches were made on the 240-fathom contour.



M/V Delaware Cruise 20 (May 21-June 2, 1956).

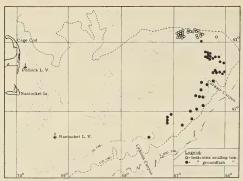
A standard No. 41 trawl was used. Damage to nets was frequent. On 12 of the 30 tows, varying amounts of damage was inflicted to the net by rough bottom.

Average weight of the ocean perch caught was 1.1 pounds, with the largest fish being taken in the western portion of the operating area.

Scallop exploration and antibiotic ice experiments will occupy the Delaware during Cruise 21, which was scheduled to depart East Boston on June 11. Areas between the 50- and 100-fathom curves at the southern part of Georges Bank were to be explored for scallops, and groundfish samples for antibiotic ice experiments were to be taken.

* * * * *

SEA SCALLOPS SOUGHT IN DEEP-WATER AND GROUNDFISH SAMPLES COLLECTED (M/N" DELAWARE," Cruise 21): Complete absence of scallops from bottoms deeper than 55 fathoms was an exploratory finding of Cruise 21 of M/V Dela-



M/V Delaware Cruise 21 (June 11-22, 1956).

aware. The 12-day trip ended with return of the Service's exploratory fishing vessel to East Boston on June 22.

The mission of the trip was twofold: the first half of the trip was devoted to exploration for scallops in the 50- to 100-fathom depth range in the vicinity of Georges Bank: the second half of the trip was used in obtaining samples of groundfish (haddock and cod) for antibiotic ice experiments being conducted by the Service's Boston Fishery Technological Laboratory.

Thirty-seven scallop drags were made in successively deeper

water, outward from known productive scallop bottoms. The gear used was a standard 11-foot scallop dredge. In no case were scallops taken from depths deeper than 55 fathoms. Of interest was the abundance of fossil ocean quahog shells in deeper waters.

Twenty-five tows were made with a standard No. 41 trawl for groundfish samples. The fish were iced in various chemical ices, and temperatures during storage recorded by means of a multistage potentiometer. Cooling rates of haddock and cod in salt-water ice and fresh-water ice were obtained. The samples, when landed, will undergo organoleptic tests in order that data on storage in various types of ices may be obtained.

MIDWATER TRAWL FISHING-DEPTH CONTROL FOUND FEASIBLE BY M/V "DELAWARE" (Cruise 22): Postive control of the fishing depth of a midwater trawl

was found to be feasible from M/V Delaware during the 9-day cruise 22. The Service's exploratory fishing vessel terminated its trip at East Boston on July 13.

The mission of the trip was to develop methods for handling middepth trawls from the side of the vessel, Atlantic Coast style, and to gain experience in controlling the depth at which the net fished.

Gear used were two midwater trawls developed by the Service's Gear ResearchStation at Coral Gables, Fla. Both trawls are of nylon mesh, $4\frac{1}{2}$ inches in the bodies, and $3\frac{1}{2}$ inches in the cod end. Of box-type construction, the headrope is equipped with aluminum floats and the footrope with steel depressors at each corner. Spread to the net opening is provided by hydroflow doors.

Once in the water, a constant signal giving the depth of the net is provided by



M/V Delaware Cruise 22 (July 5-13, 1956).

a telemeter device, developed by the Coral Gables Group.

In this fashion, using variations in vessel speed and length of towing wire, it was found possible to precisely control the depth of the net.

Future cruises are planned in which attempts will be made to apply this gear and technique to the capture of ocean perch.

M/V <u>Delaware</u> was scheduled to depart on July 23, 1956, for joint operations with M/V <u>Alba-</u>



The Service's research vessel Delaware.

tross III. Mission of the operations will be to provide data on the efficiency of a "balloon" trawl in catching groundfish, compared with the efficiency of the standard No. 41 trawl.



Marketing Prospects for Edible Fishery Products, July-September 1956

Civilian consumption of fishery products per person during the third quarter 1956 in the United States is expected to be a little lower than a year earlier, and retail prices somewhat higher. Through mid-1956, civilian consumption of edible fishery products has been at a lower rate than a year earlier primarily because of

PROZEN FOODS

the small reductions in the packing of both canned fish and frozen fish sticks. Retail prices through mid-1956, judging from wholesale prices in major markets, averaged much higher than in the same period of 1955.

June were substantially larger than a year earlier. The large increase in the catch of tuna and Pacific mackerel (which are used mainly for canning) more than offset the indicated small drop in the landings of species usually sold fresh or frozen.

Commercial freezings of edible fishery products in the United States during the first half of 1956 were slightly smaller than a year earlier. Although freezings will continue to increase seasonally during the summer months, for the year as a whole they are not expected to exceed those in 1955. Cold-storage holdings on July 1 were slightly lower than on the same date last year. Stocks of frozen products will increase during the remainder of the year as supplies are built up for distribution next winter when commercial fishing operations will be at the seasonal low point.

Through April, imports of fishery products, other than frozen tuna for canning, were much higher than in the same period of last year. Receipts of the major canned commodities were up by a third, and of the important fresh and frozen items by more than one-sixth. Sharp increases occurred for both canned salmon and fresh and frozen shrimp.

Exports of the important types of canned fish were a little lower than in the four months of 1955, with the increase for canned California sardines (pilchards) almost offsetting the large decline for canned salmon.

The analysis appeared in a report prepared by the Agricultural Marketing Service, U.S. Department of Agriculture, in cooperation with the U.S. Fish and Wildlife Service, and published in the former agency's July 27, 1956 release of The National Food Situation (NFS-77).



North Atlantic Fisheries Investigations

HADDOCK EGGS AND LARVAE DISTRIBUTION SURVEY CONTINUED BY "AL-BATROSS III" (Cruise 76): The distribution of haddock eggs and larvae, tempera-



The Service's research vessel Albatross III.

ture and salinity, and the general circulation pattern of the Gulf of Maine and Georges Bank area were studied during a 13-day cruise (June 11-24) by the Service's research vessel Albatross III.

During the cruise approximately 3,100 miles of continuous plankton tows were made at the surface and 10 meters with Hardy Plankton Recorders; 275 bathythermograph lowerings, 137 salinity samples, and 25 surface tows with the standard meter net were made. Samples of eggs were hatched out for identification purposes and a total of 1,140 drift bottles were released throughout the area.

Cusk, hake, yellowtail, rockling, gray sole, cunner, and whiting eggs; haddock, cod, pollock, hake, ocean perch, herring, rockling, gray sole, lumpfish, pilotfish, and threespine stickleback larvae were found. No haddock larvae were found off Long Island as in May, but a few were found over the southeast part of Georges Bank.

The <u>Albatross III</u> was scheduled to sail July 5 for Georges Bank to collect data on the distribution and density of sea scallops by means of dredging and underwater photography. All scallops taken were to be tagged and returned to the water.

* * * * *

NEW FISHERIES RESEARCH VESSEL SHAKEDOWN CRUISE (T-79, Cruise 1): This was a shakedown cruise to test the suitability of \overline{T} -79 as a fisheries research vessel, to test the fishing gear and hauling equipment, and to tag haddock. "Small Mussels" (18 miles southeast of Pollock Rip light vessel) was the area of operations.

Three sets were made, each consisting of one tub of line-trawl gear. The bait used was chopped frozen herring. A power gurdy was used to haul the trawl aboard.

This was the first research cruise aboard \underline{T} - \underline{T} 9 and the vessel was found to be adequate for line-trawling and fish-tagging purposes. The deck space is ample enough to permit safe comfortable areas for setting and hauling the gear and for the tagging operation. The trawl gear and hauling equipment worked satisfactorily.

A total of 65 scrod and large haddock were tagged through the gill cover with Petersen disc tags. Both yellow- and white-numbered discs were used. The tags were fastened with stainless-steel tagging pins.

Haddock were not abundant in the area at this time so that many of the hooks came up with no fish. About 15 cod were caught and subsequently released.

Another cruise aboard \underline{T} - $\overline{79}$ was planned about June 25 for the purpose of tagging haddock in the Gulf of \overline{M} aine.



North Atlantic Herring Research

FISH-FINDER SOUNDINGS BY M/V "METACOMET" LOCATE HERRING (Cruise 2): Continuous soundings to locate herring, recording continuous surface temperatures, bathythermograph casts, and eight experimental sets with the Canadian-type midwater trawl were the objectives of cruise 2 (May 30-June 6) of the M/V Meta-

comet, a Fish and Wildlife Service chartered exploratory fishing vessel. Five days of heavy fog curtailed operations.

Scattered schools of fish believed to be herring were observed off Pemaquid Point and at the entrance to Friendship Harbor on May 30. A good showing of fish that made sounder markings characteristic of herring brit were sounded in the St. George River on May 31 and scattered schools were observed on the same date between Monhegan Island and Matinicus Island. A few scattered schools of fish were sounded in North Haven Harbor, near Cape Rosier, and in Eggemoggin Reach on June 1.



U. S. Fish and Wildlife Service Cruise 2 of Chartered M/V Metacomet.

Also, one set of the trawl was made on fish near Cape Rosier, catching a small number of brit averaging approximately 2 inches in length.

June 2, 3, and 4 were spent in Blue Hill Bay. Small schools of fish on the bottom were observed near Long Island, Placentia Island, and in Union River during this period. Two sets of the midwater trawl here failed due to improper operation of one trawl door.

On June 5 and 6 soundings were made from Blue Hill Bay to Mt. Desert Rock, to Matinicus Island, to Monhegan Island, to 10 miles southwest of Portland Lightship, and to Boothbay Harbor. Very good showings of fish were recorded at 69 4.5 W. longitude and 43 40 N. latitude near Monhegan Island the night of June 5 at depths of from 20 to 75 feet and at the entrance to Boothbay Harbor on June 6.

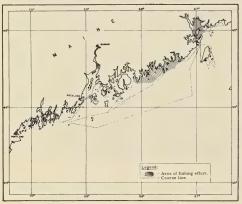
The method of putting the trawl off the stern and towing from this position worked well but the doors did not work as they should at any time. Further work will be carried on to correct them.

Cruise 3 of the <u>Metacomet</u> was scheduled for June 13-22. The more eastward part of the Coast of Maine was to be worked first and most throughly on this cruise since heavy fogs prevented operations in that area during cruise 2. A radar set was installed on the <u>Metacomet</u> between the two cruises to combat the fog problem.

The fishing gear aboard on this cruise includes gill nets, a lampara seine, and a midwater trawl. It was hoped that with these three types of gear aboard any substantial bodies of fish located may be sampled.

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FISH-FINDER SOUNDINGS OFF MAINE AND CANADA BY M/V "METACOMET" (Cruise 3): Fishing and fish-finder soundings were carried out along the eastern part of the coast of Maine from Boothbay Harbor to Eastport by the M/V Metacomet, a Fish and Wildlife Service chartered exploratory fishing vessel. Similar work was



Chartered vessel Metacomet (Cruise 3).

done in the Canadian waters of Passamaquoddy Bay (St. Andrews Bay) around Grand Manan Island and in the Bay of Fundy near the Wolves Islands and along the North Shore to Cape Mace.

The major part of the cruise was spent in the area east of Frenchmans Bay. This plan of operation was followed in an attempt to gain more knowledge of the occurrence of herring in the areas where sardine-size fish were still relatively scarce or unreported at the time of the cruise. The cruise was made in two parts; June 14 through 22 and June 25 through 29.

The areas shaded on the diagram were fished with herring gill nets and a British Columbia-type midwater trawl. Small numbers

of sardine-size herring were caught in the gill nets in St. Andrews Bay and in Machias Bay. Two catches of smaller herring averaging 4.7 and 4.1 inches, respectively, in standard length were made with the midwater trawl in St. Andrews Bay. Herring brit with average lengths of 2 to $2\frac{1}{2}$ inches were located with fish finder and sampled in nearly all of the shaded area.

During this cruise an aerial survey was made in the area from Machias Bay to Cape Mace, including Grand Manan Island and all of Passamaquoddy Bay. A series of 6 flights was made, 2 in the early morning hours and 4 in the evening, in an effort to locate schools of herring. Although the major part of this area was covered in each of the flights no schools of herring were located.

Cruise No. 4 of the <u>Metacomet</u> was scheduled for July 9-18. Coastal and inshore waters of the Gulf of Maine between Casco Bay and the Bay of Fundy were to be sounded with the fish finder and fished with gill nets and midwater trawl gear. This work was to be augmented with aerial work as during cruise 3, weather permitting.

North Pacific Exploratory Fishery Program

PROMISING RESULTS WITH MIDWATER TRAWLS BY "JOHN N. COBB" (Cruise 27): Some promising results in offshore midwater trawling were obtained on a 6-

week cruise by the Service's exploratory fishing vessel John N. Cobb, which returned to Seattle on June 22. More than 20 species of fish were caught in the midwater trawls from the Washington coast to northern Vancouver Island.

Fishing from near the surface to within a few feet of the bottom, the vessel's mid-water trawl took mixed catches up to 5,500 pounds in 20 minutes. Largest catches were predominately hake, black rockfish, and dogfish. In one 2-hour tow with the trawl at 37 fathoms in water depths of 62-70 fathoms



and dogfish. In one 2-hour tow The John N. Cobb, a vessel operated by the Service's Branch of Commercial with the thours at 37 feathorns in Fisheries, is conducting exploratory fishing in the North Pacific,

water depths of 62-70 fathoms, the catch included 1,100 pounds of black rockfish and 320 pounds of hake. Up to 1,800 pounds of dogfish were taken with the Canadian midwater herring trawl off Vancouver Island.

Smaller amounts of lingcod, herring, smelt, Pacific ocean perch, and other less important commercial species were also taken on a number of tows. A sur-

Every first of the second of t

M/V John N. Cobb Cruise No. 27 (May-June 1956).

prising catch of pink shrimp was made in midwater at night off northern Vancouver Island. Many tows caught nothing except jellyfish and plankton which caught in the meshes of the trawls.

Gear experts from the Fisheries Research Board of Canada and a biologist from the State of Washington Department of Fisheries cooperated in the experiments. The Canadian nylon midwater herring trawl was used in a number of tows along the west coast of Vancouver Island. No sizable schools of herring were located, and the best catch was 10 pounds of herring. Two nylon midwater trawls, with 40foot and 50-foot square openings, made at the Service's Gear Research Station at Coral Gables, Fla., were used for the remainder of the 66 tows completed during the trip. These trawls had $4\frac{1}{2}$ -inch mesh in the bodies and $3\frac{1}{2}$ inch mesh in the cod ends. After a few days of experience and with some modifications to the trawls and trawl doors, all gear operated satisfactorily in the offshore waters, even in fairly choppy seas.

Depth of the trawl was determined at all times with the telemeter which was developed

especially for this work at the University of Miami Marine Laboratory. The instrument was attached to the trawl cable just ahead of the port door. Depth signals were received from the telemeter through a hydrophone, and the trawl was either raised or lowered to the desired depth by adjusting the amount of cable out

or the speed of the vessel. Greatest depth fished was 210 fathoms off the Washington coast in 800 fathoms of water.

A "Sea Scanar" and a recording depth sounder were used to locate schools of fish in midwater. "Blind" tows, made with no indication of fish on either instrument, usually resulted in no catch. Some success was obtained in correlating catches with echoes received on the instruments, but in some instances catches were poor even with good echo indications of fish. It was apparent that an electronic fish finder is essential to successful offshore midwater trawling, but extensive experience will be required for the operator to be able to identify species shown by different types of echoes.



Oregon

TRAWLING REGULATIONS REVISED: Two changes in regulations effective June 20, governing commercial fishing for various ocean fishes in Oregon coastal waters, have been adopted by the Oregon Fish Commission, according to the State Fisheries Director.

In accordance with one change, only otter-trawl nets of a mesh size of three inches or less or $4\frac{1}{2}$ inches or greater, stretched measure between knots, will be lawful. The new mesh sizes have been installed to provide maximum protection for small-size Dover, English, and petrale sole and still allow a legal harvest of Pacific ocean perch. The ocean perch gill badly and are difficult to remove from larger size mesh.

An additional revision of ocean fishing regulations provides that the incidental catch of Dover, English, and petrale sole, prohibited for use for reduction or as animal food, shall not exceed 2,000 pounds or 20 percent by weight, whichever is the greater, of a single landing, sale, or purchase. The regulation formerly limited the incidental catch of the three species to 2,000 pounds or 20 percent of a single trip or fare. The Director said the revision was adopted primarily to facilitate enforcement of the incidental catch regulation.



Oysters

REGULATIONS ADOPTED BY NATIONAL CONFERENCE OF WEIGHTS AND MEASURES: Regulations which apply to the fresh shucked and canned oyster trade



Shucking oysters.

were adopted by the National Conference of Weights and Measures at the annual meeting in Washington, D.C., the last week in May 1956. These are the first regulations for the oyster industry which have been promulgated by this body. Automatically they become effective in several states and the recommendations of this body are given favorable consideration generally in the others. The regulations as adopted follow:

Oysters shall be classified in two groups.

Group (1). Raw or Fresh Oysters—Raw or fresh oysters in tins, glass, or other containers, shall be sold by avoirdupois net weight or liquid measure, and the package shall not contain more than 10 percent liquid at 45° F. Any tests made to determine the quantity of contents in a package shall consist of enough packages to total at least 1 gallon.

Group (2). Canned Oysters that are Heat Treated and Hermetically Sealed—Canned oysters that are heat treated and hermetically sealed shall be sold by avoirdupois net weight, and the drained weight of the oysters in each container shall not be less than 59 percent of the declared net weight of the contents of the package.

The oyster industry recommends the following method be used, in the field, to determine the free liquid content of raw or shucked oysters.

"Open the container and, without pressure against the oysters in the container, drain for a period of one minute into a glass graduate, and from this procedure determine the amount of liquid so drained from the container.

"Since raw oysters are subject to changes in the pH value, due either to improper refrigeration or age, the use of a pH Comparator will determine any such changes. If the pH of the oysters reaches a pH of 5.8 or less, the free liquid content should not be determined."



Pacific Oceanic Fishery Investigations

ALBACORE TUNA TAGGED ON JAPANESE FISHING GROUNDS: Two U. S. Fish and Wildlife Service investigators recently returned to Hawaii from Japan, where they carried out albacore tagging work in cooperation with Japanese fisheries research agencies. The two Service investigators arrived on May 16 in Tokyo, where they were put in touch with the various local research agencies actively engaged in the albacore tuna fishery. The Mie Prefecture Fisheries Experiment Station appeared most interested in participating in the albacore tagging program proposed by the Americans, and after a visit to the Station, at Hamajima in Mie Prefecture, and conferences with its director, a contract was concluded which made it possible to tag and release albacore from the Station's 200-ton "fisheries guidance vessel" Jini Maru.

Two tagging cruises were made, the first departing from Shimizu on May 29 and returning to the same port on June 8; the second departing Shimizu on June 9 and returning to Misaki on June 21. A total of 270 albacore were released with numbered tags of plastic tubing tied through the skin and muscles of their backs. The weight of the marked fish averaged about 20 pounds each.

The objective of such tagging experiments is to clarify the apparently wideranging but little understood migrations of this commercially-valuable "white meat" tuna species. Albacore marked with similar tags off the California coast and to the north of Hawaii have been recaptured by Japanese fishermen off the coast of Japan and in the open Pacific near Midway Island. It is hoped that recaptures of tagged tuna released within 500 miles of the Japanese coast from the <u>Jini Maru</u> may show whether or not there is a return migration of this species across the Pacific from west to east.

A secondary objective of the cooperative venture was to introduce the American tuna tagging method to Japan and to interest the Japanese in carrying on similar work independently in the future. It is anticipated that in the coming year the Japanese Fisheries Agency, through its Nankai Regional Fisheries Research Laboratory, will encourage and coordinate tuna tagging experiments by prefectural and other local research organizations. Large-scale tagging programs will also be carried out in the central Pacific and on the American west coast by American agencies in a concerted Pacific-wide effort to shed some light on the mysterious movements of this valuable commercial fishery resource.

* * * * *

HAWAII SKIPJACK FISHING GROUNDS SURVEY COMPLETED BY "HUGH M. SMITH" (Cruise 34): A two-month oceanographic and fishing survey in Hawaiian waters was completed when the Service's research vessel Hugh M. Smith returned to Honolulu on June 30. The cruise was part of an intensive investigation being made



The Service's research vessel Hugh M. Smith.

to determine reasons for the fluctuations in catches of skipjack tuna (aku) from year to year and to learn why catches of skipjack are high in some localities and low in others. During the cruise collections were made on 3 different occasions to study variations in the amount of plankton present during the period of the cruise and also to compare the abundance of plankton now with that at other times of the vear. Water temperatures were recorded and sea-water samples collected for chemical analysis at a series of oceanographic stations occupied twice during the cruise.

Information gained from analyses of these data will aid in determining the variations in water flow through the island area which in turn may be associated with abundance of aku.

In addition to the study of the environment, plastic tags were placed on 200 skipjack as part of a two-fold project to learn more of the migrations of skipjack and to

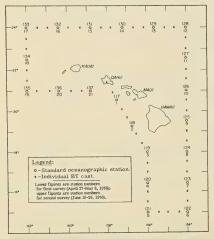


Fig. 1 - Hugh M. Smith Cruise 34 (April 27-June 30, 1956).

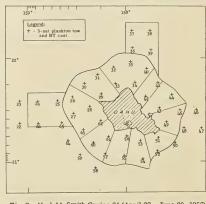


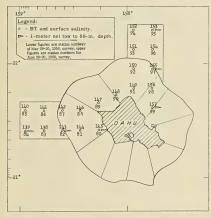
Fig. 2 - Hugh M. Smith Cruise 34 (April 27 - June 30, 1956).

devise better methods of tagging. Part of the fish were tagged and released about 120 miles to the north of Oahu while the remainder were tagged and released

in waters adjacent to Oahu and Lanai. Some of the aku were tagged with a standard type tag while others were tagged with a new tag developed by Service biologists. Recovery of these tagged fish by local fishermen will furnish information as to migrations and growth of the skipjack and the suitability of the new tag. When operating within range of the local skipjack boats, radio broadcasts were made twice daily

to inform fishermen of the presence of fish schools sighted by the $\underline{\text{Hugh }}\underline{\text{M}}.$ $\underline{\text{Smith}}.$ $\underline{\text{Moderate numbers of schools of both large and small skipjack were observed, but many of the schools were wild and difficult to fish.$

Two skipjack scouting trips were made to the north of Oahu and one to the south (fig. 4). A total of 4 days was spent scouting beyond 100 miles north of Oahu. Fifteen bird-accompanied fish schools were observed of which 8 were identified as skipjack. A total of 103 16- to 20-pound skipjack and 2- to 3-pound skipjack were



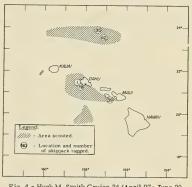


Fig. 4 - <u>Hugh M. Smith</u> Cruise 34 (April 27- June 30, 1956).

Fig. 3 - Hugh M. Smith Cruise 34 (April 27-June 30, 1956).

caught and of these 36 large and 42 small skipjack were tagged. In the southern area

during 2 days of scouting 18 flocks were observed and 5 of these were identified as skipjack. No fish were caught during this period (May 14 to 28); 6 days were spent in fishing for bait with a total bait catch of 273 buckets of nehu.

During 7 days of scouting in waters adjacent to Oahu, Molokai, and Lanai (fig. 4) 44 bird-accompanied schools were observed and 12 of these were identified as skipjack schools. A total of 139 skipjack were caught and 118 of these were tagged and released. Experimental all-plastic dart tags were placed on 45, blue California-type G tags on 37, and white California-type G tags on 36 skipjack. One fish tagged with a dart tag weighed 20 pounds, the remaining 117 averaged 5 pounds in weight. Fishing and scouting for bait took 10 days during the period June 1 to 17 with a bait catch of 276 buckets of nehu.

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SKIPJACK TUNA BEHAVIOR IN HAWAIIAN WATERS STUDIED BY "CHARLES H. GILBERT" (Cruise 28): To determine why some skipjack (aku) tuna schools can be fished more successfully than others, the Service's research vessel Charles H. Gilbert studied the feeding reactions and the movements of the various schools encountered in Hawaiian waters. After a two-week cruise, the vessel returned to Honolulu on June 5.

The newly-installed "Scanar" was tested during this cruise. This electronic fish finder, which works like underwater radar, returned positive signals from 5 skipjack schools and suspected signals from 10 schools. One school was detected at a distance of 1,200 feet. With greater experience in the interpretation and identification of the echo signals, it is hoped that the "Scanar" will not only reveal the

presence of tuna schools below the surface at some distance from the ship, but that it will also facilitate a study of their movements and behavior.

The vessel spent 10 full days of scouting during which 21 skipjack schools were seen. The schools were unusually wild and sample catches were made only with difficulty. One phase of this work is to see if there is any relationship between the "biting quality" of the school and the kind and quantity of natural food in the stomachs of the fish.

Two other vessels of the Pacific Oceanic Fishery Investigations are also studying the behavior, migration, and abundance of skipjack in an effort to aid the local fishermen. The principal effort of these two vessels is to tag the skipjack and thus trace their movements into the Hawaiian fishery.

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SECOND SPRING SKIPJACK SCOUTING CRUISE COMPLETED BY "JOHN R. MANNING" (Cruise 31): The capture of two large albacore tuna trolling through a



John R. Manning, one of the three research vessels of the Pacific Oceanic Fishery Investigations, at Pearl Harbor.

mixed school of albacore and skip-jack highlighted this cruise of the Service's research vessel John R. Manning. This mixed school was found just a few miles from Midway. A total of 26 skipjack were caught of which 12 were tagged and released. The two albacore caught are the largest ever caught on trolling lines by the Pacific Oceanic Fishery Investigations. The vessel returned to port on June 22 after five weeks of skipjack scouting in the waters north of the Leeward Islands.

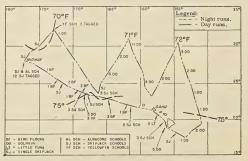
Additional schools of skipjack were found south and west of French Frigate Shoals. A school of yellowfin tuna was found northwest of

Midway and two of seven fish caught were tagged and released.

A survey of bait fish at Pearl and Hermes Reef, Midway and French Frigate Shoals showed a scarcity of iao or silversides, but fair numbers of small aholehole.

A census of Hawaiian monk seals showed an increase in pups at Pearl and Hermes where 108 adults and 25 pups were counted, At Midway, 10 adults and 5 pups were seen and at French Frigate. Shoals, 18 adults and 10 pups were counted.

Direct trolling with 6 lines showed a lack of skipjack tuna in the waters north of the Leeward



John R. Manning Cruise 31 (May 19-June 22, 1956).

Islands but a concentration of bird flocks and schools of very small skipjack (12" to 15") south and west of French Frigate Shoals on the initial run from Oahu to Pearl

and Hermes Reef. Six identified schools and 11 bird flocks were seen on that run. In addition, a mixed school of dolphin and yellowfin was found about 150 miles southwest of French Frigate Shoals. A mixed school of skipjack (6-8 pounds) and albacore was found just off Midway. Two albacore of 42 and 48 pounds each were caught on the trolling lines, one got off and one was hooked on a pole but escaped. These albacore are the largest taken on trolling lines by POFI and the first to be hooked by a pole fisherman. The thermocline was extremely shallow in this area (10-20 ft.) which may account for the presence at the surface of these large albacore. Three schools of very small skipjack were seen inside the lagoon at French Frigate Shoals. Single skipjack were caught or hooked northeast of Midway and again north of French Frigate Shoals and south of Hawaii. A school of yellowfin was encountered at 32°03′ N., 172°39′ W. in water of about 70° F. Dolphin were common east of 165° W.

No significant amounts of bait fish were seen at Pearl and Hermes Reef. Scattered schools of 3 to 6 buckets of iao (P. insularum) and aholehole (K. sandvicensis) occurred at Southeast and Sand Islands. A few buckets of small mullet were seen at North Island. At Midway, 55 buckets of iao were found and caught at East Island. In addition, about 110 buckets of small aholehole and over 500 buckets of small goatfish (Mullidae) were seen at East Island and the adjacent sand bars. Around Sand Island, only scattered schools of aholehole (175 buckets), piha (S. delicatulus) (105 buckets) and iao (10 buckets) were seen. At French Frigate Shoals, 23 buckets of iao were seen of which 18 were captured, at East Island. In addition, 31 buckets of iao were seen at Gin and Little Gin. Small samples of iao and aholehole were taken for length frequency and maturity studies, when possible.

Twelve out of 26 skipjack caught off Midway were tagged with blue California-type G tags. Two yellowfin from the school northeast of Midway were also tagged.



Public Eating Places Survey

PUBLICIZING BENEFICIAL QUALITIES OF FISHERY PRODUCTS BELIEVED DESIRABLE: According to the results of a scientific sample survey of 4,500 establishments representing all public eating places in the United States, it was found that 52 percent of the managers or operators of public eating places serving fish and shellfish felt that an educational program pointing out the beneficial values of fish and shellfish would definitely help them to increase sales of fishery products, while only 26 percent expressed doubt as to the usefulness of such a promotional effort, and 22 percent expressed no opinion.

Number of Establi	Number of Establishments Serving Fishery Products Indicating Opinion as to Whether Publicizing									
Beneficial Qualities Would Sell More Fish and Shellfish, by Geographic Region										
Total Would Would Not Don't Know No Reply										
	Number	Number	Percent			Number	Percent	Number	Percent	
United States Totals	208, 100	107,800	51.8	54,600	26.2	43,600	21.0	2,100	1.0	
By Regions:										
Northeast	68,000	34, 400	50.6	18,900	27.8	14, 400	21.2	300	0.4	
North Central	59,700	29,900	50.1	16,800	28.1	12,100	20.3	900	1.5	
South	45,900	25,000	54.5	10,300	22.4	9,900	21.6	700	1.5	
West	34,500	18,500	53.6	8,600	24.9	7,200	20.9	200	0.6	

There are 208,000 public eating places in the United States which serve fish and shellfish. Operators of eating places are particularly interested in increasing their sales of fish since, in the opinion of a majority of them, there is as much or more profit from a serving of fish and shellfish as from a serving of other high protein items such as steak, roast beef, or chicken.

Final results of the survey, which is being financed by funds made available under the Saltonstall-Kennedy Act of 1954, are scheduled for publication this year.



Saltonstall-Kennedy Act Fisheries Projects

SHRIMP, SPONGE, AND TUNA PROBLEMS RESEARCH CONTRACTS AWARD-ED: Three research contracts for projects to study problems in the tuna, shrimp, and sponge industries were recently awarded by the Fish and Wildlife Service, Secretary of the Interior Fred A. Seaton said July 7. The work is part of the Salton-stall-Kennedy program to increase production and markets in the domestic fishing industry.

Two of the projects, one an investigation of Florida commercial sponges and the other an investigation of the causes and prevention of "black spot" on shrimp, will be conducted by the Marine Laboratory of the University of Miami. The third, an oceanographic investigation of the eastern tropical Pacific Ocean for the benefit of the tuna industry, will be made by the Scripps Institution of Oceanography of La Jolla, Calif.

The scene of the oceanographic study, the tropical Pacific west of Central America, is the big fishing area for the American tuna fleet. The purpose of the study is to make it possible to forecast the time and area for good tuna fishing and so provide a scientific basis for increasing the efficiency of the tuna fishery.

Since tuna presence and abundance is dependent to a great extent upon food supply, and since plankton, which is the chief direct or indirect food source for ocean fish, is affected by water conditions, the many phenomena which affect water conditions will come within the scope of the study.

Among the things which bring about the fluctuations in the abundance of plankton are the chemical nutrients brought to the surface by "upwelling" of water from the lower reaches of the ocean and by the retention of fertile water in the "interface" between ocean currents. Hence the waters of the Baja California, Tehuantepec, and Panama upwellings and the interface between the Peru Current and the Gulf of Panama water will be subject to various physical and chemical examinations. The behavior and the relationship of tuna to the changes in water conditions will also be studied. The contract price with the Scripps Institution for an initial phase of the study is \$35,000.

"Black spot" in shrimp is a condition which became evident when shrimp fishermen began operations in shrimping areas located several days offshore in the Gulf of Mexico. While black spot carries no health hazards it does tend to lower the consumer acceptability of the product and to lower its value accordingly. The condition does not appear in the shrimp which are taken close to the Gulf ports and which are utilized within two or three days.

When black spot appears it is after the uncooked shrimp have been on ice for several days. In an effort to learn when it occurs and exactly what is the contributing factor to this condition, technologists will study every phase of the shrimp operations from the time the shrimp are caught until they are ready for use. The contract price with the University of Miami for this work is \$19,900.

The sponge research contract with the University of Miami is for \$12,000. It is an extension of a \$20,000 contract negotiated last year. This is a general investigation of the Florida commercial sponge resource. Specific attention is to be paid to the location and extent of the grounds, distribution, rate of reproduction and growth, the effect of nonselective harvesting, the effectiveness of the Federal minimum-size law, environmental factors, and sponge diseases.

* * * * *

CANNED FISH CONSUMER PURCHASES STUDY: Approximately 2,500 house-wives in 100 selected counties throughout the United States were scheduled to be interviewed in June in the course of a national consumer survey designed by the U. S. Fish and Wildlife Service to give a cross-section of the purchase pattern of the American housewife with respect to canned fishery products.

The results of the study will be of considerable importance to the domestic fishing and fish-processing industries in fitting their products into the general food tastes and buying habits of the householder, according to the Director of the Fish and Wildlife Service. The study will show whether the marketing practices of a given area are such that the consum-

will show whether the marketing practices of a given area are such that the consumers' desires for canned fishery products are satisfied.

Information will be obtained on (1) factors influencing the use or non-use of the various species and types of canned fish and shellfish in the household, (2) opinions and preference of consumers regarding certain characteristics of canned fishery products, and (3) methods of preparing and serving canned fish.

The project is being financed by funds made available by the Saltonstall-Kennedy Act of 1954.

The survey will be conducted under supervision of the Fish and Wildlife Service by W. R. Simmons and Associates Research, Inc., of New York City.

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FOREIGN MARKETS FOR UNITED STATES FISH OILS BEING STUDIED; A study of the markets for United States-produced fish oils with emphasis on the Western Europe and North Atlantic countries is being conducted by the U. S. Fish and Wildlife Service with Saltonstall-Kennedy Act funds. The study has two primary objectives:

- Study the present and potential markets for United States-produced fish oils in Western Europe.
- Study present and potential foreign fish-oil facilities as they constitute competition to the United States production in these markets.

The present survey is planned to cover Norway, Sweden, Denmark, the Netherlands, Germany, Belgium, France, England, and possibly Switzerland. The survey is being conducted by J. W. Stedman, Chief, Foreign Marketing Branch, Fats and Oils Division, Foreign Agricultural Service, U. S. Department of Agriculture on a cooperative contract with the Fish and Wildlife Service.

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FRESH FISH CONSUMPTION INCREASE SOUGHT IN INLAND UNITED STATES: A three-city study which could be the basis for a broad campaign to increase the consumption of fresh fish and shellfish in inland United States will be made during the coming months, the Director of the U.S. Fish and Wildlife Service announced July 1.

The three cities selected are Nashville, Tenn.; Indianapolis, Ind.; and Portland, Me. Portland was selected for comparative purposes to determine whether results of promotional efforts to expand the market for fresh fish differ in inland and coastal areas. For the purpose of the study fresh fish are defined as those,

dressed or not, which are not frozen, cured, or otherwise preserved. Fish which are simply iced are classified as fresh.

Previous studies have shown that the per capita consumption of fresh fish by persons in areas not adjacent to the sea coasts or to the Great Lakes is lower than



Typical retail fresh-fish market.

that of persons living on the seaboard. The purpose of the study is to attempt to learn in more detail why this is so, and to explore ways and means of increasing the consumption of fresh fish in the inland areas.

Wholesalers, retailers, and housewives in the three cities will be questioned during the survey. Promotional campaigns will be discussed with fresh fish distributors and follow-up campaigns will appraise the effectiveness of any promotional efforts.

Information will be obtained on the species of fresh fish and shellfish sold in the stores; the quality of the fish and the amount of waste; the availability of

the desired species; methods of handling and taking care of the fish; methods of display; dealers' preferences as to prepackaging; policy on markups; possibility of cooperative advertising and other promotional campaigns; trends in fish sales and the reasons.

In addition to the information which will be obtained from dealers who handle fish, interviews will be held with those who do not handle fresh fish to determine their reasons for not doing so.

Housewives to be interviewed will be primarily those who come to the stores to purchase fresh fish. The interviews will be in the store or at the home by appointment. The housewife will be asked if she is satisfied with the quantity and kind of fish available; the type purchased and the type preferred; suggestions on improvements on quality, display, packaging, dressing or other characteristics or factors; circumstances which might induce the housewife to use more fresh fish. In addition, housewives who do not purchase fresh fish will be interviewed to determine their reasons for not doing so.

The study will be made by the Bureau of Business Research, College of Business Administration, Boston College. Interviewing is scheduled to start October 1 and be completed by December 1. Between now and the start of interviewing, specific plans will be discussed with industry, and questionnaires prepared and pretested. The final report is not due until next spring.

The survey is part of the Saltonstall-Kennedy Act program for increasing production and expanding the market for domestic fishery products.



South Atlantic Exploratory Fishery Program

MORE DEEP-WATER RED SHRIMP EXPLORATIONS BY "PELICAN" (Cruise 3): Deep-water exploratory shrimp trawling by the Service's exploratory fishing vessel Pelican during May and June consisted primarily of additional exploratory coverage of the 150- to 225-fathom depth range from Cape Canaveral to St. Augus-

tine, including preliminary work with commercial-scale gear and bottom survey and exploratory trawling north of Jacksonville to Georgetown, S. C.

Twenty-five 4- to 5-hour drags between Cape Canaveral and St. Augustine produced 2,700 pounds of red shrimp (Hymenopenaeus robustus) during the period. The most productive drags were made in the 175- to 212-fathom range southeast of St. Augustine using a 40-foot trawl. Three tows in this area produced 1,020 pounds at a rate of 85 pounds an hour.

There was a complete loss of two commercial rigs, an 86-foot and a 60-foot flat trawl, due to parting of the $\frac{3}{8}$ "-diameter towing warp.

The exploratory work in the red shrimp depth range north of Jacksonville revealed untrawlable bottom as far north as Beaufort, S. C. Four drags in the 170- to 250-fathom range from Beaufort north to Georgetown, S. C., produced a few P. megalops, a smaller deep-water shrimp (60-70 count, heads on), but no red shrimp. Bad weather prevented northward continuation of the trip.



Location of exploratory trawling stations by the Service's exploratory fishing vessel, Pelican,

MIDWATER TRAWLS AND TELEMETERING DEPTH FINDER TESTED BY M/V "GEORGE M, BOWERS" (Cruise 3): Gear-research operations with experi-



The Service's research vessel George M. Bowers.

mental midwater trawls and with a recently-developed telemetering depth sounder were conducted by the Service's exploratory fishing vessel George M. Bowers April 6-April 19, 1956. These tests were made in offshore Gulf Stream waters between Fort Lauderdale and Key Largo, Fla.

Continued research in single-boat midwater-trawling devices by the Service's Gear Research Unit at Coral Gables, Fla., has indicated that practical midwater trawls should be lightweight and strong, easily handled and maneuverable over a range of speeds, and that the trawl depth must be controllable at all times. Systematic investigations and observations of trawl behavior with undersea television and by divers with cameras have resulted in some improved designs. During this cruise a 30-foot cotton trawl and 40- and 50-foot nylon nets were observed to be performing as

designed under experimental fishing conditions.

Tests were also conducted with the telemetering depth sounder attached to the 40-foot trawl. The telemeter is a remote depth sounder designed to give accurate position of the trawl over a range of 0-200 fathoms and to one mile in distance. This new instrument was developed under contract to the Service by the University of Miami Marine Laboratory.

The experimental trawls and the telemeter are to be used in exploratory fishing activities by the Service in the Pacific Northwest and in New England waters.

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FISHING FOR SARDINELIKE FISH OFF SOUTHERN FLORIDA BY M/V "GEORGE M. BOWERS" (Cruise 4): Scouting and fishing for sardinelike fish in



M/V George M. Bowers (Cruise 4).

lower Florida Bay and around the Keys south of Marathon were the principal objectives of Cruise 4 (June 12-27) of the Service's exploratory fishing vessel George M. Bowers.

Samples of sardinelike fish caught on this trip were frozenfor technological studies. Anchovies, balao, and other unidentified species were preserved. Ten fishing stations were made at night between Marathon, Fla., and the Dry Tortugas. Harengula, weighing 6 per pound, were caught with a light

and trap lift net west of Snipe and Content Keys. Juveniles and small fish, one inch and less, were taken with a light and dip nets southeast of the Marquesas Keys. During daytime-scouting operations sardinelike fish were sighted and taken with a beach seine near the Dry Tortugas. Attempts were made to take surface schools of fish by trawling, but such schools were too wary and broke up or avoided the vessel.

A biologist of the Marine Laboratory of the University of Miami collected data from ten two-hour drags which were made on the Tortugas shrimp grounds. Using a fine mesh cover over the cod-end, shrimp escapement through different sizes of cod-end mesh was determined.



U. S. Fish Stick Production

APRIL-JUNE 1956 PRODUCTION BELOW LAST YEAR: United States production of fish sticks in the second quarter of 1956 totaled 11.3 million pounds, according to Fish Stick Report, April-June 1956 (C. F. S. No. 1380) recently published by the U. S. Fish and Wildlife Service. This was 5.3 million pounds (32 percent)

Table 1 - U. S. Production of F	Table 2 - U. S. Fish Stick Production by Areas, April-June 1956								
Month	Cooked Uncooked Total				April-June				
	(Million Lbs.)			Area	1	956	1955		
April	3.5	0.4	3.9		Firms	Quantity	Firms	Quantity	
May	3.4	0.4	3.8		No. 27	Million Lbs.	No.	Million Lbs.	
June	3.2	0.4	3.6	Atlantic Coast States	27	9.2	28	14.2	
Total 2nd Quarter: 1956	10.1	1.2	11.3	Interior and Gulf States.	6	1,3	8	1.4	
1955	15.3	1.8	17.1	Pacific Coast States	10	0.8	11	1.5	
Total January-June: 1956	24.8	3.1	27.9	Total	43	11.3	47	17.1	
1955	31.8	4.3	36.1						

less than the quantity produced during the first quarter of the year and 5.8 million pounds (34 percent) less than the production reported for the corresponding period of 1955.

Production during the second quarter of 1956 averaged 3.8 million pounds a month as compared with an average monthly production of 5.7 million pounds during the second quarter of last year. The largest quantity of fish sticks ever produced during a single month occurred during March 1955 when 7.4 million pounds were packed.

In the second quarter of 1956, 89 percent of the total production was precooked. Uncooked sticks accounted for the remaining 11 percent. During this same quarter, 27 of the 43 producing firms



in the United States were located in the Atlantic Coast States and accounted for 9.2 million pounds--82 percent of the total production. Plants located in the interior of the country and in the Gulf States manufactured 1.2 million pounds of fish sticks and firms situated in the Pacific Coast States produced nearly 838,000 pounds.



U. S. Foreign Trade

EDIBLE FISHERY PRODUCTS, MARCH 1956: United States imports of edible fresh, frozen, and processed fish and shellfish for March increased about 1.6 per-

March 1956 with Comparisons										
		Quant:		Value						
Item	M.	ar.	Year	Ma	Year					
	1956	1955	1955	1956	1955	1955				
	(Mill	ion of	Lbs.)	(Million of \$)						
Imports:			1			1				
Fish & Shellfish:										
Fresh, frozen &										
processed1/	62.8	76.7	768.3	17.5	18.5	206.4				
Exports:					_	-				
Fish&Shellfish:		}			1					
processed1/										
only (excluding										
fresh&frozen)	6,3	7.1	91.0	1.3	1.6	21.8				

cent in quantity, but decreased 2.2 percent in value as compared with February 1956. Compared with March 1955 the imports for March 1956 declined 18.2 percent in quantity and 5.4 percent in value. The dollar value in March 1956 was about 27.9 cents a pound, compared with 24.1 cents a pound in March 1955. Shrimp imports were about 1.5 million pounds higher in March 1956 when compared with March 1955, but the imports of groundfish fillets, canned fish, and salmon were lower.

Exports of processed fish and shellfish in March 1956 decreased about 7 percent from the February 1956 total, and were also down 11 percent from March 1955. The

value of exports in March 1956 declined 13 percent when compared with February 1956 and 19 percent below March 1955.

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FISHERY PRODUCTS IMPORTED FROM MANY COUNTRIES: More countries are now supplying fishery products to United States markets than in former years, according to a review of certain principal fishery products imports made by the U.S. Fish and Wildlife Service.

Shrimp was imported from 26 countries during 1955, compared with 23 countries in 1954. In 1940, 10 countries supplied shrimp to United States markets. Imports of fresh, frozen, canned, and dried shrimp in 1955 were valued at \$24.5 million dollars at the foreign port of shipment.

Groundfish and ocean perch fillets were imported from 12 countries in 1955-the same number as in 1954. In 1940, 99 percent of these imports were received



from Canada and Newfoundland. Imports of these products during 1955 were valued at almost \$25 million f.o.b. foreign ports.

Tuna, in its various forms, came from 21 different countries in 1955. In 1940, 12 countries supplied tuna to the United States. United States imports of tuna were valued at the foreign port of shipment at \$33.2 million.

Lobsters, in their various forms, were imported from 28 countries during 1955. In 1954, 23 countries shipped lobsters, but only 10 countries supplied lobsters to the United States in 1940. Lobster imports in 1955 were

valued at \$35.2 million f.o.b. foreign ports.

Swordfish came from 6 countries in 1955 as compared with 2 countries in 1940. These imports had a foreign value of \$5.4\$ million.

Crab meat imports originated in 6 countries, about the same as in 1940. Imports were valued at \$4.9 million.

In 1955 about 50 different countries contributed to the imports of the commodities shown. Imports of these products during 1955 totaled about 436 million pounds and had a value of \$128 million at the foreign point of shipment. In 1940, these same products totaled 66 million pounds at a value of \$10.7 million.

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GROUNDFISH FILLET IMPORTS DOWN 10 PERCENT IN JUNE 1956: Imports of groundfish (including ocean perch) fillets during June 1956 amounted to 7.5 million pounds as compared with 8.3 million pounds imported during June of last year. This 10-percent decrease was primarily due to a 1.0-million-pound drop in imports from Canada. Imports from Denmark and the Netherlands

from Canada. Imports from Denmark and the Netherlands were also lower. Iceland, France, and West Germany exported somewhat more fillets to the United States during June 1956 than during the same monthlast year. There were no imports from Sweden, Norway, Japan, Greenland, Miquelon and St. Pierre, and the Union of South Africa during June 1956.



Canada continued as the leading exporter of groundfish fillets to the United States with nearly 6.0 million pounds during June of the current year--79 percent of the month's total fillet imports. Canada accounted for 84 percent of the total fillet imports during the same month last year.

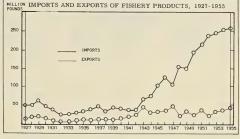
Total groundfish and ocean perch fillet imports during the first half of 1956 amounted to 66.5 million pounds and for the corresponding period last year they

totaled 62.6 million pounds. Canada, with 44.8 million pounds, led all other countries exporting fillets to the United States during January-June 1956, followed by Iceland (15,2 million pounds) and Norway (2,3 million pounds). Note: See Chart 7 in this issue.

UNITED STATES FOREIGN TRADE, 1955: United States foreign trade in fishery products and byproducts during 1955 was valued at more than 296 million dollars, according to <u>Imports and Exports of Fishery Products</u>, 1951-1955 (C. F. S. No. 1360), recently issued by the Fish and Wildlife Service. This was an increase

of 4 percent as compared with the previous year. Imports of \$256 million were nearly 2 percent greater than those of the previous year, and exports of \$40 million were 27 percent greater than in 1954.

During 1955 imports of edible fishery products amounted to nearly 770 million pounds valued at \$207 million; nonedible products and byproducts imports were valued at \$49 million. Among the more important items imported



in greater quantity than in 1954 were fresh or frozen tuna; flounder fillets, swordfish, and other species; shrimp; canned salmon, tuna not in oil, crab meat, and common lobster; and pickled or salted cod.

Exports of edible fishery products in 1955 totaled 109 million pounds valued at \$25 million; nonedible products and byproducts were valued at \$15 million. Exports of canned fish and shellfish increased from 49 million pounds in 1954 to 89 million pounds in 1955 while the quantity of fish oils exported (143 million pounds) increased only 1 million pounds during the same period.



FISH AND SHELLFISH LANDINGS, 1955: Food fish and shellfish landed by Washington commercial fishermen in 1955 amounted to 147.6 million pounds, with a wholesale value of \$33.5 million, according to a May 9, 1956, release by the State Department of Fisheries.

Nine states and Alaska outranked Washington in aggregate landings, but the value of the State's canned and processed fish was the third highest. Total pack was down slightly from 1954 because of the lower catch of sockeye salmon.

The quantity of the 1955 catch has been exceeded seven times since 1935, although the 1955 total is well above the 20-year average of 137 million pounds.

Salmon fishermen landed 8, 381, 400 fish worth \$11, 945, 000 ex-vessel at an average of \$1.43 per fish. The total salmon catch of 61.6 million pounds (22 percent of the U.S. and Alaska catch) was the smallest odd-year catch of salmon since 1943. The most prolific species of salmon, the odd-year pink, yielded 31, 691, 800

pounds, but the catch of chum salmon was the lowest since records have been maintained on the Puget Sound fishery.

The otter-trawl and long-line fleets landed 58.2 million pounds of sole, Pacific ocean perch, rockfish, and halibut; all with a processed value of \$7.9 million. The



Halibut and salmon fleet of the West Coast,

catch exclusive of halibut totaled 42.1 million pounds. Only 1954 and 1945 were better trawl years.

Shellfish production totaled 19.4 million pounds worth \$6.0 million when processed. This included 10.1 million pounds of shelled Pacific and Olympia oysters, and 6.7 million pounds of Dungeness crabs. The crab catch (3,606,000 in number) was the second best since 1949. The 1954 crab catch was 4,182,700 crabs. Other shellfish production included hard-shell and razor clams, shrimp, scallops, and octopus--2.6 million pounds.

The remaining landings of 7.9 million pounds came from smaller fisheries on albacore, anchovies, candlefish, carp, hake, herring, shad, smelt, sturgeon, and industrial fish.

The statewide canned salmon pack amounted to 613, 798 48-pound cases, of which 412, 159 cases were pink salmon. While the total pack was not exceptional for an odd year, it was well above the average of 578,070 cases for pink salmon years since 1935. Puget Sound packers also processed 64,584 cases of salmon, mostly chum, from fish imported from Alaska and British Columbia.

For the first time figures are included on personal-use pack of salmon, razor clams, and other seafood. The 1955 pack was 6,527 48-pound cases. The 1954 pack was 4,427 cases.

The wholesale value of the entire salmon catch, excluding the pack from imported fish, was \$21.5 million.

The State's production of all species of fish and shellfish comprised 3.2 percent of the poundage and 6.4 percent of the value of all fishery products landed in the United States and Alaska in 1955.

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OLYMPIA OYSTER INDUSTRY ENDANGERED BY EXCESSIVE MORTALITY: The Olympia oyster which is native to the Puget Sound area of the State of Washington is threatened with extinction, according to industry spokesmen in that area. The oystermen predict that 90 percent of the Olympia oyster stocks will be wiped out within a year if mortalities continue at the present rate. The causes of the high rate of mortality is uncertain. Biologists of the Washington State Fisheries Department, who are investigating the problem, have not reached a final conclusion. However, fisheries biologists blame some of the losses on a parasitic flatworm which was introduced with the importation of Japanese or Pacific oyster seed.



Wholesale Prices, June 1956

Lower prices in June for fresh drawn haddock, fresh and frozen haddock fillets, frozen ocean perch and flounder fillets and fresh shrimp caused the June 1956 overall wholesale index (109.7 percent of the 1947-49 average) for all edible fish and shellfish (fresh, frozen, and canned) to drop 1.8 percent below that for May. However, this June's overall index was still 5.8 percent higher than in June 1955.

At Boston a labor-management dispute at a large fish cold-storage warehouse, which disrupted normal marketing of fish landings, and the usual seasonal increase in landings caused June 1956 ex-vessel fresh haddock prices to drop 20.6 percent below May and 35.7 percent below the same month a year earlier. The opening of the Pacific Coast halibut season and the increased supplies of fresh and frozen halibut induced a drop in prices from May to June of 13.3 percent for this product, but this June's prices were still 44.4 percent higher than in June 1955. Fresh-water

Table 1 - Wholesale Average Prices and Indexes for Edible Fish and Shellfish, June 1956 With Comparisons								
Group, Subgroup, and Item Specification	Specification Point of Pricing Un			Prices1/	Indexes (1947-49=100)			
			June 1956	May 1956	June 1956	May 1956	Apr. 1956	June 1955
ALL FISH & SHELLFISH (Fresh, Frozen, & Canned)					109.7	111.7	108.6	103.7
Fresh & Frozen Fishery Products:							115.2 100.5	107.4
	Boston	1b.	.06	.07	106,3 56,3	113,3 70,9	50.1	87.5
Halibut, West., 20/80 lbs., drsd., fresh or froz.	New York	1b.	.33	.40	107.3	123.8	106.2	74.3
Salmon, king, lge, & med., drsd., fresh or froz.	New York	lb.	.64	.63	144.4	140.5	137.1	129.2
Whitefish, L. Superior, drawn, fresh	Chicago	1b.	.53	.62	131.4	153.7	171.0	120,2
Whitefish, L. Erie pound or gill net, rnd., fresh	New York	lb.	.69	.74	139.5	148.6	121.3	136.5
Lake trout, domestic, No. 1, drawn, fresh		ш. 1b.	.58	.51	117.8	104.5	110.6	107.6
	Chicago New York	lb.	.34	.29	78.6	68.0	49.3	103.8
Yellow pike, L. Michigan & Huron, rnd., fresh .	New Tork	m.	,34	.29	18,0	00.0	49,3	103.0
Processed, Fresh (Fish & Shellfish):					127.7	126,1	126,6	111.6
Fillets, haddock, sml., skins on, 20-lb. tins	Boston	1b.	.25	.27	85.1	91.9	81.7	107.2
Shrimp, lge. (26-30 count), headless, fresh	New York	lb.	.82	.79	129,3	124.8	124.8	111.4
Oysters, shucked, standards	Norfolk	gal.	5.50	5,50	136.1	136.1	139,2	114.4
Processed, Frozen (Fish & Shellfish):					112,1	115.2	114.3	103,2
Fillets: Flounder, skinless, 1-lb. pkg	Boston	1b.	.40	.40	102.1	103.4	103,4	102.1
Haddock, sml., skins on, 1-lb. pkg	Boston	1b.	.28	.29	86,3	91.0	91.0	81.6
Ocean perch, skins on, 1-lb. pkg	Boston	lb.	.28	.29	110.8	114.8	114.8	106.7
Shrimp, Ige. (26-30 count), 5-lb. pkg	Chicago	lb.	.75	.76	116.1	118.1	116.5	103.4
Canned Fishery Products:					98,7	99.0	99,2	98.3
Salmon, pink, No.1 tall (16 oz.), 48 cans/cs	Seattle	case	21.27	21.27	120.0	120.0	120.0	109.6
Tuna, lt. meat, chunk, No. 1/2 tuna (6-1/2 oz.), 48 cans/cs.	Los Angeles	case	10,60	10.60	76,4	76.4	77.1	90.1
Sardines, Calif., tom. pack,No. 1 oval (15 oz.), 48 cans/cs.	Los Angeles	case	7.50	7.50	87.5	87.5	86,1	88,1
Sardines, Maine, keyless oil, No. 1/4 drawn (3-1/4 oz.), 100 cans/cs.	New York	case	8,20	8,45	87,3	89,9	89.9	71.3

L/Represent average prices for one day (Monday or Tuesday) during the week in which the 15th of the month occurs. These prices are published as indicators of movement and not necessarily absolute level. Daily Market News Service "Fishery Products Reports" should be referred to for actual prices.

fish price trends at Chicago and New York were mixed, with whitefish prices lower because of adequate supplies and yellow pike and lake trout prices higher because of light supplies. All of these factors caused the June 1956 index for the drawn, dressed, or whole finfish subgroup to drop 6.2 percent below May, but it was 4.9 percent higher than in the same month in 1955.

From May to June higher prices for fresh shrimp at New York City more than offset lower prices for fresh haddock fillets at Boston and the fresh processed fish



Fish auction at Bost Fish Exchange,

and shellfish subgroup index rose 1.3 percent in that period. Compared with the same month in 1955, the June 1956 index for this subgroup was 14.4 percent higher because substantially lower prices for fresh haddock fillets were more than offset by considerably higher prices for fresh shrimp and shucked oysters.

All items appearing under the frozen processed fish and shellfish subgroup were priced lower this June than the previous month, and the index for this subgroup dropped 2.7 percent during that period. The index for this subgroup was 8.6 percent higher this June than in the same month a year earlier because frozen haddock fillets, ocean perch fillets, and shrimp were priced considerably higher.

There was very little price movement in the canned fishery products subgroup items with prices this June only slightly lower than the previous month and only slightly higher than in June 1955. With the appearance of the new pack of Maine sardines on the market, prices for this product dropped slightly from May to June in spite of the fact that the pack through June was not very substantial. Compared with June 1955, prices this June were considerably higher for canned Maine sardines and pink salmon because supplies were rather limited, but canned tuna prices were 15.2 percent lower because there were more than ample supplies.



IMPORTS AND EXPORTS OF FISHERY PRODUCTS, 1951-1955

This annual bulletin (Imports and Exports of Fishery Products, 1951-55, C. F. S. No. 1360) shows United States fishery import and export data for the years 1951 through 1955. The quantity and value of the fishery products and byproducts imported and exported by type of product are shown.

Copies of this publication are available free from the Division of Information, U. S. Fish and Wildlife Service, Washington 25, D. C.



International

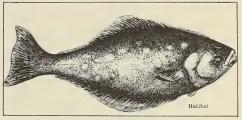
INTERNATIONAL PACIFIC HALIBUT COMMISSION

FIRST SEASON IN AREAS 2 AND 1B CLOSED: The International Pacific Halibut Commission announced the closure of the first season in Areas 2 and 1B to halibut fishing at 6 a.m. (P.S.T.), June 27, 1956, until the beginning of the second fishing season in these areas. The Commission estimated that the 26.5-million-pound

limit set for Area 2 would have been caught by that date. Area 1B which had no catch limit was also closed when the quota for Area 2 was at-

tained.

The official opening date for all halibut fishing in the Pacific regulatory areas this year was May 12 at 6:00 a.m. (P.S.T.). However, this year both United States and Canadian fishermen voluntarily agreed not to start



fishing until May 20. In 1955 the official opening date was also May 12 (actual fishing also started on that date), and Areas 2 and 1B in that year closed on June 5. Halibut fishing Areas 2 and 1B this year were open for 46 days, but because of the voluntary agreement to start fishing on May 20, fishing took place for only 38 days. These same areas were fished for 24 days in 1955, 21 days in 1954, and 24 days in 1953. The fishing in these areas lasted longer this year because (1) fishing started 8 days later than the opening date, (2) most vessels voluntarily agreed to remain idle for 7 days after each trip, (3) there was about three days of inclement weather on the fishing grounds, and (4) fish were scarce in certain popular fishing sections.

The second fishing season in Areas 2 and 1B shall commence at 6 a.m. (P.S.T.) on August 10 for at least seven days with no catch limit, or on a later date that may be announced by the Commission prior to commencement of the second season, or if the termination of the first season in Area 2 or in Area 3A be later than 6:00 a.m. on July 25, the second season in Area 2 shall commence at 6:00 a.m. 16 days after termination of the first season in Area 2 or in Area 3A, whichever shall be later, and shall terminate at 6:00 a.m., seven days after commencement of the second fishing season in Area 2, or on any later day that may be announced by the Commission prior to the commencement of the second season.

Area 2 includes all Convention waters off the coasts of the United States and Alaska and Canada between Willapa Bay and Cape Spencer, Alaska.

Area 1B includes all Convention waters between Heceta Head and Willapa Bay, Wash.

Areas 3A and 3B on June 27 were still open to halibut fishing and will close when the limit for Area 3A of 28 million pounds has been attained.

FOOD AND AGRICULTURE ORGANIZATION

ANTIBIOTICS USE AND QUALITY ASSESSMENT HIGHLIGHTS FISH-PROCESSING TECHNOLOGISTS MEETING: The use of antibiotics as an aid to keeping fish in



a fresh condition and the problems associated with the assessment of the quality of fish were the highlights of the International Meeting of Fish Processing Technologists which was held at Rotterdam, The Netherlands, June 25-29, 1956.

The meeting, which was organized by the Food and Agriculture Organization of the United Nations, was attended by more than 100 fishery technologists from about 30 countries. The reports from working groups set up by the FAO Interim Committee on Fish Handling and Processing were first heard

and then followed a symposium on the chilling of fish.

The first report of the working groups of the FAO Interim Committee on Fish Handling and Processing was on chilled fish, presented by F. Bramsnaes, Director, Technical Laboratory, Danish Ministry of Fisheries, as Chairman of the working group dealing with that subject. In the course of his report, Bramsnaes said that it was far more difficult to keep fish in a fresh condition than to keep other food in a similar condition. Most foodstuffs kept in a good condition at any one of a range of low temperatures, but fish was a more sensitive product. He gave as an example the fact that cod will keep fresh twice as long at 0° C. (32° F.) as at 4° C. (39° F.). This fact, which has been shown in the later years by the scientists, was of practical importance to the fishing industry.

The second report, that of the working group concerned with fishery products for tropical consumption, was presented by K. Bakken, Norwegian Fisheries Research Institute, Bergen, who stated that the working group had surveyed the food habits in tropical countries. As a result of this survey the group had come to the conclusion that there was a potential market in many tropical countries for unsalted, dried, or smoked and dried whole herring and other fish, as well as for dried minced fish and for fish meal. This report indicated that the fishing industry in Europe and North America might find a considerable market for certain products in countries in Africa and Asia where there was an acute need for providing more animal protein in the diet of the masses of the people.

E. Heen, Director, Norwegian Fisheries Research Institute, Fisheries Department, Bergen, as Chairman, presented the report of the working group concerned with the freezing of fish in bulk.

These reports stimulated considerable discussion among the delegates before the meeting turned to the symposium on the chilling of fish, in the course of which some 27 papers were presented.

The first session of the symposium was concerned with 9 papers dealing with the use of antibiotics, bacteriostatic ices and dips, and it was clear from the discussion which followed that the subject of antibiotics was in the forefront of the minds of most participants. Most of the 9 papers were concerned with experiments which have been made with such antibiotics as aureomycin and it can be generally said that these experiments show that the use of antibiotics may help considerably in keeping fish in a fresh condition, in some cases as much as 2 or 3 times as long as is now possible by using such conventional methods as storing in ice. Various uses of antibiotics were described in the papers, some of them concerned with impregnating ice with aureomycin or other antibiotics.

It was clear from the papers presented and from the discussion that one of the problems confronting fishery scientists was to devise a method which would insure that the residue of any antibiotics left in fish would be so minute as to be innocuous to human beings. Scientists are also concerned with insuring that antibiotics used are distributed evenly throughout the ice.

It was pointed out at the meeting that the Governments and public health authorities would need to have very carefully detailed facts concerning the residue and its harmlessness to human beings before they would be justified in officially sanctioning the use of antibiotics to preserve fish. So far, no government has approved the use of antibiotics for this purpose.

Some experts at the meeting urged that this problem of residual antibiotics should be approached with "common sense" and that excessive apprehension as to any possible injurious effect of residual antibiotics should not stand in the way of progress in this field. Indeed, many experts at the meeting were emphatic that the time had come to conduct large-scale experiments by responsible institutes in the use of, for example, aureomycin-treated ice on trawlers engaged in long-distance fishing. This could be done, they urged, with the consent of the public health authorities in the countries concerned, and the results would, they suggested, provide a very clear guide as to future action.

While the points concerned with the public health factor were given due consideration by the experts at the meeting, it was evident that most of the technologists felt that the use of such antibiotics as aureomycin might be extended to commercial fishing in the near future. Some experts, indeed, feel that antibiotics should be introduced without delay.

Dr. H. L. A. Tarr, of the Fisheries Research Board of Canada, who was a pioneer in the use of antibiotics to preserve fish, has expressed an opinion that the residual antibiotics would not be dangerous to human health.

Two reports by United States scientists showed that, in one experiment, fish fillets treated with 10 p.p.m. of chloramphenicol, oxytetracycline, tetracycline, and chlortetracycline spoiled after 8, 11, 10, and 13 days respectively, as compared with 4 days for untreated fillets.

In another experiment, haddock fillets dipped for 30 seconds in antibiotic-treated brine kept in good condition for 7 days and more.

Dr. J. M. Shewan, of the Torry Research Station, Aberdeen, reporting on experiments with aureomycin, stated that such fish as haddock and cod had been kept in an edible condition for 7 to 10 days longer than possible by conventional methods. These results had been confirmed by pilot-scale trials on board a trawler.

Japanese scientists, T. Tomiyama, Y. Yone and S. Kuroki, of Kyushu University, also recorded similar successful results in experiments with aureomycin used in storing yellow croaker, red sea bream, and red-tongue sole.

A paper on "Aureomycin as an Ice Additive" by B. Albertsen, of the Technological Laboratory, Danish Ministry of Fisheries, stated that tests indicated cod could be kept in good condition 5 to 6 days longer in aureomycin-treated ice. Similar results were reported by Sverre Hjorth-Hansen of the Norwegian Fisheries Research Institute, Bergen.

Dealing with the "Public Health Aspects of the Use of Antibiotics in Foods,"

C. Engel, of the Central Institute for Nutrition Research, Utrecht, said that "sensitization of future patients" and the induction of resistance in strains of bacteria are important problems which must be carefully considered before permission is granted to use antibiotics for keeping food in a fresh condition. If the residual level of the antibiotic in fish or other fresh food is negligible some, but not all, of the objections to its use will be eliminated. The best answer would be to use antibiotics which are not applied in medical practice and do not give rise to bacterial cross-resistance to antibiotics used in the human body.

C. H. Castell, of the Fisheries Research Board of Canada, said that the first requirement for landing fish in a fresher condition was more hygienic handling of the catch on board fishing vessels. When this was achieved, then the antibiotics might be used with advantage to preserve fish. Antibiotics should not be used to overcome bad, unhygienic handling of fish.

Other experts at the meeting pointed out that manufacturers of antibiotics were aware of this and were in agreement with the view expressed by Castell.

Five papers were presented on brine cooling and seawater ice, and considerable discussion took place concerning them. But, next to the papers concerned with antibiotics, the 12 papers dealing with quality assessment of fresh fish provoked the most discussion. Here the meeting considered both organoleptic and objective methods of quality assessment, and it was evident from the discussion that the technologists thought that much more use should be made of the panel system for testing quality of fish. It was clear that no method or system had yet been devised which was applicable generally but it was felt that progress had been made in this field. The aim was to devise an objective method of testing the quality of fish which could be applied on a commercial basis, but much experimental work remained to be done.

There is no doubt that the meeting had several practical results. Perhaps the most important for the fishing industry throughout the world was the clear expression of opinion of the experts that the time had come to carry experiments in the use of antibiotics from the laboratory to the commercial field. The experts felt that these experiments should be conducted, with the concurrence of governments and public health authorities, on a large scale with fishing vessels, particularly those engaged in long-distance fishing. This, it was felt, would establish the effectiveness of antibiotics in preserving the fresh condition of fish and would also enable authorities to determine the element of risk entailed in residual antibiotics in fish.

The meeting also showed that a great deal of work is now being done in the assessment of the quality of fish and that ultimately this may lead to the establishment of quality assessment of all catches landed by the leading fishing countries.

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PLAN FOR CUTTING COSTS IN BUILDING FISHING BOATS: Costs of building fishing boats may be cut by as much as 10 percent if a plan for establishing a universal system of standards for scantlings,

now being prepared by naval architects of the Food and Agriculture Organization (FAO), Rome, is finally adopted. The system would also lead to developments in the design of fishing vessels and an increase in their seaworthiness and operational efficiency.

Speaking at FAO headquarters this week, Jan Olof Traung, Chief, Fishing Boat Section, Fisheries Division, said: "Work on preparing a first draft of a universal system of standards of scantlings is still in the formative stage, although we have for some years past been gathering information on the design and construction of fishing boats, paying special attention to the smaller vessels, those under 100-foot over-all length.



"We have acquired first-hand knowledge of construction problems and local requirements in Europe, North America, and also in the Near, Middle, and Far East and South America, where FAO naval architects have been engaged on various projects.

"At the present moment we are especially well placed to plan the future work on reducing boat construction costs," he continued, "as we have four FAO naval architects at headquarters: Paul Ziener of Norway, who has been working for us in India for the past two years, Howard Chapell, an American naval architect who is known throughout the world for his work on fishing boats (he is going on an FAO assignment in Turkey), my assistant, Peter Gurtner from Switzerland, and myself."

These four experts have been reviewing the progress made in fishing-boat construction, based on the reports, plans, and designs of naval architects throughout the world.

"Recently," said Traung, "Dwight Simpson, a well-known American naval architect, in an unpublished study dealing with wooden-trawler construction, made some far-reaching recommendations for minimum standards of scantlings.

"Simpson based his findings on the case history of more than 20 vessels. By comparison, European vessels were found to be suprisingly heavily constructed. This is also true, as we know from experience, of fishing boats in many other parts of the world and we believe that if the Simpson recommendations were universally adopted the result would be to cut the present high costs of fishing-boat construction, especially in Europe and in many of the underdeveloped countries."

The system envisaged by the FAO naval architects would call for no departure from normal construction methods carried out by skilled craftsmen.

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INTERNATIONAL FISHING GEAR CONGRESS PLANNED: An International Fishing Gear Congress is being planned by the Food and Agriculture Organization (FAO), Rome, to take place in October 1957 in Hamburg, Germany.

The Congress will bring together from many parts of the world specialists working in the field of fish gear research, design, and manufacture to discuss such subjects as net yarns, net-making, rational design of fishing gear, including fish detection and the use of electrical equipment.

"This will be the first time that such specialists from various parts of the world will meet to exchange knowledge, experience, and ideas," explained the Chief of the Fishing Gear Section of the Fisheries Division of FAO. "The Congress will last a week and will concentrate on recent developments in fishing-gear design, materials, and construction, including such matters as the measurement of the performance of gear, detection of fish, behavior of gear under water, reaction of fish to it, and so on.

"There has been a vast increase in capital investment in fishing equipment in recent years," he continued, "and fishing-gear technology is assuming an evergrowing economic importance. One objective of the Congress will be to focus attention on this, taking stock of existing knowledge in this field."

In connection with the Congress, FAO is compiling a comprehensive Handbook of Fishing Gear and Methods, the first of its kind. The book will provide detailed descriptions and specifications of advanced types of fishing gear, equipment and methods, and will give solid background information to the many topics which will be discussed at the Congress.

The purpose of this Congress is to emphasise the recent developments in fishing gear, not to describe traditional types of gear which have long been used in fishing in various countries. The Congress therefore is concerned with the latest types of commercially-important gear and with current thought and experiment concerned with improving existing fishing gear and accessory equipment, manufacturing it more economically, making it more efficient, and operating it more effectively. In view of these considerations, the proposed agenda for the Congress has been drawn up under these main headings: (1) materials; (2) rational design of fishing gear; (3) rational construction of nets; (4) operation of fishing gear; (5) strategy and tactics of fishing: (6) electrical fishing: (7) future developments.

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<u>UNITED STATES NOMINEE FOR DIRECTOR-GENERAL OF FAO:</u> The Departments of State and Agriculture announced jointly July 12 that John H. Davis, director of the Program in Agriculture and Business at Harvard University Graduate School of Business Administration, will be the United States Nominee for Director-General of the Food and Agriculture Organization.

A special conference of FAO is being held in Rome in September to select a successor to Dr. P.V. Cardon, who was elected Director-General in 1953 and resigned last March because of ill health.

Davis is a former Assistant Secretary of Agriculture and former president of the Commodity Credit Corporation.

The decision to nominate Davis for the Director-Generalship has been made after consultation with, and the approval of, Congressional and farm organization leaders. Member nations of FAO have been consulted regarding Davis and a number of them have informally indicated their support.

Under FAO procedure, the United States delegation to the special conference will formally submit the name of Davis as candidate for the Director-Generalship. The member countries of FAO will elect the new FAO head by majority vote.

WHALING

NUMBER OF WHALE CATCHER BOATS REDUCED BY AGREEMENT: According to an agreement arrived at in June 1956 between Norwegian, British, Dutch, and Japanese whaling companies, the number of catching boats engaging in Antarctic whaling will be reduced from last season's 257 to 225 in the 1956/57 season.



Under the agreement the nine Norwegian expeditions will reduce their catchers from 110 to 95, the four British expeditions from 59 to 47, and the Dutch from 18 to 14. The five Japanese expeditions, including the newly purchased Onassis expedition, will have 54 catchers, compared to 55 for the same expeditions last season.

The agreement also specifies that no one expedition will use more than 12 catcher boats. The Soviet Union has not yet indicated whether it will also reduce its total of catchers.

The agreement is the result of efforts on the part of Norwegian whaling companies to limit the number of catchers per expedition as a conservation measure, states a June dispatch from the United States Embassy in Oslo.

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SOUTH PACIFIC SPERM WHALE ALLOTMENT PROPOSED: An advertisement in the Lima newspaper <u>El Comercio</u> of June 10, 1956, signed by the Secretary General of the "Permanent Commission of the South Pacific," it stated that the Commission of the Conference of Exploitation and the Conservation of the Maritime Resources of the South Pacific was scheduled to meet on June 25 in Lima. The meeting was to deal with allocating to interested parties their share of the allotment of 2,100 sperm whales which has been set for the period July 1, 1956, to June 30, 1957. Such parties were advised to send their applications through their Consuls or representatives to the Secretary General of the Permanent Commission in care of the Ministry of Foreign Relations, Quito, Ecuador, before June 23, according to the United States Embassy at Lima (June 20, 1956).

An article in <u>La Prensa</u> of June 19 on this subject stated that any attempt to hunt whales within 200 miles of the coasts of Chile, Ecuador, and Peru would be considered an act against the sovereignty of those nations unless permission had first been obtained from The Permanent Commission.



Australia

FISHERIES DEVELOPMENT FUND PLANNED: Legislation is in the process of passing through the Australian Parliament setting up under the Fishing Industry Bill of 1956 a Fisheries Development Trust Account. The trust fund would be used as a revolving fund for the development of new projects which could be liquidated as soon as private investors were willing to take them up. The fund is to be administered by Australia's first Minister for Primary Industry. Marked for first attention in planning a developmental program for consideration by the Minister are shrimp, pilchards, tuna (Queensland, North-West Australia and outer South-Eastern Australian waters), and trawling in the Great Australian Bight.

The fund will be financed from the surplus which will arise from the sale of the Australian Whaling Commission's business (a Government operation) at Carnarvon in Western Australia for about US\$2.0 million. It is reported that the sale will make possible the biggest move in Australia's history for the development of the nation's fishery resources, for the surplus from it, which may amount to US\$1.7 million, will be paid into a new Fisheries Development Trust Account for that purpose, a June 6 United States Embassy dispatch from Canberra points out.

In his Second Reading Speech on the Fishing Industry Bill, the Minister for Trade explained, "The surplus funds received from the sale of the Australian Whaling Commission will be used for the purpose of developing fishing industries which have great potentialities, but which would not attract—at any rate up to now have not attracted—investment funds without Government support or demonstration." He indicated that with large—scale investment and new techniques on fishing there was hope that the catch of tuna, prawn, shrimp, and perhaps other fish (e.g. pilchards, barracouta, and Australian "salmon") could be improved. Were the Government to show the way, it might be possible that private interests would come in to enlarge the present investment—"about US\$22.5 million in fishing and pearling fleets, shore installations and factories and a further US\$7.9 million in the whaling industry"—in the Australian fishing industry, the Minister indicated.

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STATE CABINET MINISTER TO VISIT U.S. FISHING PORTS: The Honorable Lionel Francis Kelly, West Australian State Cabinet Minister for Mines, Fisheries, Industrial Development and Tourism, was planning a three months' visit to the United States and Canada starting in late July 1956. He will be accompanied by two of his staff.

In addition to providing information on Western Australia to interested persons and groups throughout the United States, the Minister was specifically interested in certain industries related to his cabinet responsibilities, including fisheries, the United States Consulate at Perth points out in a June 12 report.

Commercial development of West Australian fisheries, with the exception of spiny lobster for export to the United States, has lagged. The Minister was interested in studying catching and handling methods for tuna, herring, shrimp, and lobster, and particularly wished to contact any groups which might consider investment in fisheries projects in Western Australia.

With reference to spiny lobster (crayfish), the Minister wished to meet importers and distributors and to study marketing techniques, with special reference to trade promotion by South Africa and other competing countries to determine whether Australia is losing potential markets or failing to get best prices.



Canada

MANDATORY STANDARDS FOR FISH STICKS: Canadian producers of cooked and uncooked fish sticks must comply with certain mandatory standards put into effect June 7, 1956 in an amendment to the Fish Inspection Regulations. Any fish sticks imported into Canada must also conform to these mandatory standards.

The text of the amendment is as follows:

"His Excellency the Governor General in Council, on the recommendation of the Minister of Fisheries, pursuant to section 4 of the Fish Inspection Act, is pleased, hereby, to amend the Fish Inspection Regulations made by Order in Council P. C. 1954-1973 of 16th December 1954, as amended, as follows:

- "1. (1) Section 2 of the Fish Inspection Regulations is amended by adding thereto, immediately after paragraph (a) the following paragraph:
 - "(aa) 'breaded fish' means fish flesh coated with breading or batter and breading but does not include fish sticks.
 - "(2) Section 2 of the said Regulations is further amended by adding thereto, immediately after paragraph (b) thereof, the following paragraph;
 - "(bb) 'fish sticks' means uniform, rectangular shaped portions of fish flesh which are coated with breading or batter and breading.
- "2. The said Regulations are further amended by adding thereto the following section:
 - "60. No person shall pack or sell fish sticks which do not meet the following requirements:
 - "(a) fish sticks shall weigh not less than I ounce each; (b) cooked fish sticks shall include a minimum of 66-3/6 by weight of fish flesh; (c) uncooked fish sticks shall include a minimum of 75% by weight of fish flesh; and (d) fish sticks shall be free from defects and shall be of good merchantable quality."

It should be noted that these are mandatory standards as compared to the voluntary United States standards for grades of frozen fried fish sticks developed by the U. S. Fish and Wildlife Service in cooperation with interested industry representatives. Any fish sticks exported to Canada must conform to the Canadian mandatory standards for cooked and uncooked fish sticks. LARGE NEW RESEARCH VESSEL: A larger and more extensively-equipped research vessel than any in its present fleet of about 14 is to be built for service in the Northwest Atlantic by the Fisheries Research Board of Canada. Tenders are being called for a 167-foot Diesel-powered steel-hulled trawler with a 32-foot beam, a draught of 12 feet 9 inches, and a refrigerated fish hold. This is part of the Board's expanded program, made necessary in part by Canada's increasing commitments in international fisheries affairs, according to the June 8 Bulletin of the Fisheries Council of Canada.

The new vessel will carry a crew of about 22 and will have accommodations for 4 or 5 scientists who will work in specially-designed laboratories to be incorporated in the vessel's working quarters. The craft is designed for exploratory and investigational work and will be capable of extended trips, often in areas remote from present fishing ports, to study the population densities of various species of fish. She will operate mainly out of St. John's Newfoundland, but is designed to serve other Board stations situated on the mainland as well.

In addition to the laboratories for biological and hydrographical work, the new research ship will carry all the latest detection devices. The fishing gear will be calibrated so that the catches will be compared with the catches of a regular trawler. She will have adequate power to fish at depths greater than those fished normally. A controllable-pitch propellor will enable her to cruise at speeds from zero to a maximum of about 12 knots.



Denmark

TWO NEW FISH MEAL PLANTS IN OPERATION: Two new fish meal and fish oil plants have begun operations at Ronland, on the northwestern coast of Jutland in Denmark. One plant is a corporation and the other is a cooperative. Present capacity of both plants is about 150 tons of raw fish daily, but the corporation plant has already announced plans to extend its daily capacity to nearly 300 tons of raw fish.

It is also reported that landings of "tobis" (a type of small sand eel) on the west coast of Jutland have been unusually heavy in the current season and that fish meal plants in the area have been forced to set an informal limit upon the total amount of "tobis" which will be accepted from each vessel, states a report (June 21) from the United States Embassy at Copenhagen.



German Federal Republic

TRAWLER OWNERS TO CONTINUE SUPPORT OF EXPORTS OF FROZEN FISH: An overwhelming majority of the owners of large German trawlers based at Bremerhaven have decided to continue the supporting of exports of quick frozen ocean fish which exporters have purchased from the trawler owners and have had processed in Bremerhaven.

Exports to the United States and to Austria, especially, will be supported according to Dansk Fiskeritidende (June 8), a Danish fishery trade paper.

This support will, at the same time, promote the rational storage of quick-frozen ocean fish at times when there are large supplies at the four main German

fish markets. Often it is difficult to dispose of all supplies, especially early in the year when 60 percent of the large trawlers trawl for herring in the westerly North Sea. In addition, it will provide for making full use of the Bremerhaven freezing capacity.

Iceland

<u>FISH FREEZING PLANTS</u>: There are 82 freezing plants in Iceland that are available for fish freezing and storage, according to the April 1 issue of <u>Aegir</u>, an Icelandic fishery publication. Two of the plants are reported to have been inactive for some time. In addition to the land-based plants, four of the larger trawlers are equipped with freezers, each with a freezing capacity of two metric tons of fillets in 16 hours.

The 32 plants are located in six districts and vary from 7 to 24 plants in each district. Under the most favorable conditions the land-based plants can freeze 1,102 metric tons each 16 hours and store 38,270 tons. The annual capacities for both freezing and storage will vary according to the length of the season, the availability of labor, and transportation facilities. The capacity of the plants for the storage of fish for human consumption is limited by the need for space for about 8,000 tons of fish bait and the seasonal storage of 6,000 tons of meat products (Fiskets Gang, May 3, 1956).



Japan

JAPANESE-MEXICAN FISHING COMPANY PLANNED: A joint Japanese-Mexican fishing company known as the Japan-Mexico Enterprises, Ltd. (Nichi-boku Kig-yo Kabushiki Kaisha) has been formed, according to the May 15, 1956, issue of <u>Hokaido Shimbun</u>, a Japanese newspaper. Plans reportedly call for 70 Japanese dragnet fishermen to go to Mexico initially, with a possible increase in numbers up to 3,600 in the future.

The organizer of the new company is the Hakodate (Hokkaido) Drag-Net Fishery Cooperative Association. This cooperative has formed, in association with Mexican fishing interests and with the blessing of the Mexican government, a Japanese-Mexican joint fishery company in Mexico. It is stated that the Mexican government has granted permission for the entry into Mexico of 6 Japanese trawlers and 36 skilled Japanese fishermen for a period of six months. Application has been made to the Fisheries Division of the Hokkaido Perfectural Government for certificates of qualification for the 36 fishermen. A representative of the Fisheries Division confirmed this last item, but stated that he could not confirm the rest of the report. His office is awaiting more details before deciding what attitude it will take toward the request for certificates.

* * * * *

PRODUCERS FORM NEW FROZEN TUNA SALES AGENCY: Currently, albacore is exported by private exporters but transactions are controlled by an association of Japanese exporters which maintains a list of approved importers. This organization, Japan Frozen Food Exporters Association, also determines and controls the voluntary limits which have been placed on albacore exports to the United States.

Another organization, known as the Japan Export Frozen Tuna Sales Co., Ltd., was scheduled to begin functioning on June 15, 1956. This organization will act as sole purchaser from fishing companies of Japanese frozen albacore destined for export and will in turn sell to exporters. The purpose of the new organization, which will be controlled by fishing firms, is to protect the interests of producers and, in so doing, to control the amount of albacore that is exported. An important consideration in this connection is the producers' interest in fixing prices in accordance with market conditions.

The new organization in its initial stages will control only albacore, but it will also handle other species of tuna in the future. The limitations on albacore export sales to the United States for the Japanese fiscal year 1956 (which began on April 1, 1956) has been fixed at 32,000 short tons, of which 20,000 short tons are to be sold in the period April-September and 12,000 for the October-March period, according to a dispatch from the United States Embassy in Tokyo



FISHING-PERMIT FEES INCREASED: Mexico has increased its fees for commercial and sport fishing permits issued to nonresident aliens and vessels of foreign registry.

The fees were raised in accordance with two decrees published in the <u>Diario</u> <u>Oficial</u> of May 15 and effective the following day.

Under one decree nonresident aliens who fish for sport in any Mexican territorial water must pay for a general fishing permit valid for 1 month, 3 months, or 1 year from date of issue, a fee of 10, 25, or 50 pesos (about US\$0.80, \$2,\$4), respectively. Previously applicable fees, established by a decree of January 20, 1933, were 4, 10, or 20 pesos (about US\$0.32, \$0.80, \$1.60).

The other decree, modifying fees for commercial and sports fishing, established by a decree of November 17, 1939, provides that persons desiring to fish commercially in Mexican territorial waters of the Pacific Ocean and Gulf of California in vessels of foreign registry and sending their catch to foreign markets will pay annual fees in accordance with the type of permit obtained. The new fees, together with old fees, are as follows:

General fishing permit for vessels having a net cubic capacity of:

Use of foreign-registered vessels having a net cubic capacity of:

	New	New Fees		ees		Nev	Fees	Old Fees
	Pesos	US\$	Pesos	US\$		Pesos	US\$	Pesos US\$
Up to 2 tons	130	10.40	50	4.00	Up to 2 tons	130	10.40	
2-15 "	2 60	20.80	100	8,00	2-15 "	520	41.60	200 16.00
15-50 "	520	41.60	200	16.00	15-50 "	1,200	96.00	500 40.00
50-100	775	62.00	300	24.00	50-100 "	2.580	206.40	1,000 80.00
100-200 "	1,035	82.80	400	32.00	Over 100 "			2,000 160.00
Over 200 ''	1.290	103.20	500	40.00				

If two or more boats are to be used, the tonnage is taken together and the fees established for the vessels, as shown above, are charged on the basis of total tonnage. If after obtaining a general fishing permit or authorization for use of a foreign-registered vessel an amplification of a permit or authorization is requested because the tonnage has been increased to

exceed the tonnage shown in the category to which the permit applies, the difference in fees for the lower and higher categories must be paid for the length of time still remaining in the original permit.

Item	New Fees		Old Fees		Item	New Fees		Old Fees	
	Pesos	US\$	Pesos	US\$		Pesos	US\$	Pesos	US\$
COMMERCIAL FISHING:					SPORT FISHING (for				
Registry of foreign vessels:					nonresident aliens):				
For each ton or fraction there-					Fishing for sport on board				
of of net cubic capacity	15	1.20	5.70	0.46	a foreign vessel(per day)	12	0.96	2.50	0.20
Registry of nets:					Fishing for sport on board				
For each linear meter or frac-					a privately-owned vessel				
tion thereof, measured on					or a vessel of Mexican				
cork line	0.55	0.044	0.21	0.017	registry:				
Issuance of identification cards:					For 3 days		0.48		0.16
To nonresident aliens	12	0.96	4	0.32	For 1 month	12	0.96	4	0.32
To nationals or resident aliens	1	0.08	1	0.08	For 3 months	25	2.00	10	0,80
	For 1 year	50	4.00	20	1.60				

The year will be counted from date of issue of a general permit, authorization for use of foreign vessel, or registration of vessel and nets. Identification cards are valid only during the year of issue.

Individuals and organizations owning foreign vessels engaged in sportfishing in Mexican territorial waters of the Pacific Ocean and Gulf of California will pay an annual fee of 2,070 pesos (US\$165.60). Formerly the fee for this type of permit was 800 pesos (US\$64.00).

Nonresident aliens engaged in sport fishing in Mexican territorial waters of the Pacific Ocean and Gulf of California will pay fees for individual permits in accordance with registry of vessel.



Norway

DRIED AND SALTED FISH EXPORT PROSPECTS REVISED: The predictions made by Norwegian exporters early in the spring of 1956 of good export prospects for fishery products have not materialized, according to a June dispatch from the United States Embassy in Oslo.

In spite of the fact that exports of salt cod and dried fish were larger from January-April 1956 than for the comparable period in 1955, increased production and difficulties in expanding the market have caused large stocks of unsold fish to accumulate. Frozen fish fillet plants have 10,000 metric tons on hand with little prospect of early sales. The outlook for increased exports of dried fish is so poor that some producers have suggested selling it to fish meal plants, if no financial support is provided by the Price Regulation Fund for Fish.



The klipfish is carefully stacked between spells of exposure to the sun,

There are still 3,000 to 4,000 tons of unsold dried fish on hand from 1955. Klipfish or salt cod is in a somewhat more favorable position, with exports of 22,000 tons by June 1 compared to 18,000 tons in the comparable 1955 period, but the outlook in several markets, notably Brazil, is uncertain.

A quota system for klipfish exports has been hotly debated since the latter part of 1955, but no decision has been reached as yet. Unless market conditions improve or the Government permits acceptance of lower export prices, industry circles anticipate unsold stocks of 30,000 to 40,000 tons of fish by the end of the year. It is believed that the fish exporters tend to exaggerate the gravity of the export situation, but the high prices of Norwegian fishery products are undoubtedly affecting the sales in foreign markets.

* * * * *

COD CATCH HEAVY THIS YEAR: Owing to the favorable results of fishing off Finnmark and partly good fishing in other districts, this year's cod fishing season has yielded a rather heavy catch. This season's catch as of June 16 totaled 159,671 metric tons of cod as against 123,286 tons last year. The cod catch was utilized



Sorting the catch--Lofoten cod fishing.

as follows this year: 77,961 tons sold for drying (last year 63,038 tons), 60,776 tons for curing (last year 40,017 tons), and 20,934 tons for the fresh fish trade (last year 20,231 tons). In addition, there was a production of 6,614 tons of cod-liver oil; 3,050 tons of roe were cured and 1,132 tons of roe were canned or sold fresh, reports the June 21 Fiskets Gang, a Norwegian fishery periodical.

A new postwar record of 53,562 metric tons of spring cod were caught off Finnmark this season-almost one-third this season's total cod catch of 159,671 tons. Last

year the catch off Finnmark amounted to 46,767 tons.

The Finnmark spring cod fishery is becoming increasingly important. For the last two years, the total Finnmark catch, including other types of fish such as saithe, ocean perch, haddock, and halibut has exceeded the Lofoten cod catch. The number of freezing plants in Finnmark is still insufficient to process a larger catch, but freezing capacity is being expanded rapidly. If present marketing difficulties are overcome, the outlook for further growth of the Finnmark fishery is good, points out a United States Embassy dispatch (June 29) from Oslo.

* * * * *

AUTOMATIC HERRING FEEDING AND SORTING MACHINE: An article titled "Sorting Machine for Herring" which appeared in the Norwegian Fisheries Directorate's publication Fiskets Gang, No. 23, June 7, 1956, is a research report on the successful trials of a machine which both aligns the herring for feeding and feeds them into the heading and gutting part of the machine. Experiments conducted by the Directorate's Chemical-Technical Research Institute have proved successful, and a prototype is now being tested commercially in the Icelandic fishery, points out a United States Embassy dispatch (June 26) from Oslo.

If the machine is commercially feasible, it will be a great help to the herring industry. It can possibly be used in processing other types of fish as well with certain modifications. The machine takes little space, is relatively inexpensive, and results in a significant saving in labor. It is also apparently suitable for use on board fishing vessels which operate in waters distant from their home ports and consequently process their catches on board.

The principal portion of a translation of the article follows:

"In the following we shall give an orientation concerning a new machine for aligning and feeding herring to other herring processing machines. There has been some incorrect information on this machine in the press. Otherwise it may be of interest to hear something of the problems of which this machine is only a part and on which we in the Fishery Directorate Chemical-Technical Research Institute have been working and will continue to work to the extent we get the necessary funds.

"It is common knowledge that little has been done so far to rationalize and improve the salted herring production. Most of the salting is still manual. The lack of mechanization is largely due to the fact that production takes a relatively short time, so that the costs of mechanization become too high in relation to the quantity produced.

"Ordinary salted herring (pickled herring) is one of the important products where a certain degree of mechanization at the larger salting works would pay, and we have made some experiments in this field. For example, we tried drum salting some years ago. Salt and herring were fed into one end of a revolving drum. The mixing in the drum was most effective and the product evenly salted. However, the best utilization of drum salting requires that the herring and salt be fed automatically into the drum in specific adjustable quantities direct from a large reservoir. We completed plans for this method long ago but have been unable to put it into effect, chiefly because of shortage of funds.

"In the case of salting in barrels the outlet end of the drum is automatically conducted from each barrel, as it is filled, to the next empty one. It is obvious that some of the labor costs of manual salting could be saved in this way. And it is no great problem to mechanize this production. The problem is doing it in a simple, cheap and effective way. The long periods of inactivity, usually in surroundings which make for corrosion and rust, are another problem. All machines and conveyors must either be made of material which does not corrode or rust or else be protected against corrosion.

"If the herring head could be cut off and the entrails removed before salting in a cheap and quick way, a better product would be produced and costly packing material and salt could be saved.

"The waste is of no value to the consumer, so if he pays a certain amount for a barrel of whole salted herrings there is no reason why he should not pay the same for the same quantity without heads and entrails. It must therefore be assumed that, for example, 1,000 hectoliters (205,000 a pound) of herring will represent at least the same sales value to the producer whether decapitated or not. The decisive factor is production cost in each case. By heading and gutting, about 200 barrels and 4 tons of salt per 1,000 hectoliters of raw product could be saved. At current prices, this would mean a cut of approximately 4,400 kroner (US\$616) in all. In addition there is the income from sale of the waste, today a minimum of 15 kroner per hectoliter (about one U. S. cent a pound). For 1,000 hectoliters of herring this would mean approximately 3,000 kroner (US\$420), in all approximately 7,800 kroner per 1,000 hectoliters (about US\$0.53 a 100 pounds), by heading and gutting. If almost 8 kroner per hectoliter can be saved, it would be defensible to make quite large investments in mechanization, particularly if the producer is certain that labor costs are no higher for headless than for whole salted herring.

"This calculation is so simple and convincing that there is every reason to make an effort to find the most rational method for production of decapitated salted herring. The same applies to filleting.

"... Some heading machines, more or less efficient, exist already. Typical of all of them is that the herring must be fed in one by one by hand. This requires a good deal of manual work and limits capacity. Most of the machines are unsuitable for ships, and for the Iceland fishery in particular this is important, as the herring should be headed and gutted on board.

"The research institute at first thought to concentrate on mechanically aligning and feeding the herring to heading machines and filleting machines for land plants. However, Engineer Peter J. F. Christie of Bergen showed us plans for a heading machine constructed for use on board vessels. We found this machine so interesting that we decided to support further work on it. The machine is now completed and has been tested two seasons during the Icelandic fishery. . . . Its capacity depends chiefly on how quickly herring can be fed into it. The gutting is entirely satisfactory. It requires little space and is cheap.

"There were several principles to work on in the case of aligning herring. We found a proposal presented by Engineer Christie the most promising, however, and decided to try it, particularly since this method not only aligns the herring but also delivers the herring one by one with suitable intervening spaces. A trial machine was built, and after some experimentation we have arrived at a type which seems 100 percent satisfactory as regards turning the head one way and delivering the herring singly. It also turns the belly in a certain direction, but the guarantee is not 100 percent here, as there seems to be a margin of error of 5-10 percent. For heading it is less important whether the turning of the belly is 100 percent certain, and for this purpose the machine is considered satisfactory. The machine has as yet been tried only with thawed frozen herring. If the belly is somewhat different from that of fresh fish and the herring is less smooth, there will probably be a smaller margin of error in turning the belly of fresh fish.

"The machine also aligns headed herring, which may be of some importance later, for example in filleting headed herring.

"It now remains to try this machine in regular production. The trial machine was a typical experimental type unsuitable for regular production. A prototype is now being made which will be sent on an Iceland vessel in July of this year to be tried in regular operation and find out whether it will be influenced by rough seas, which we do not think it will.

"The machine is simple and cheap and requires comparatively little space. It can take the herring from a reservoir or be supplied with smaller or larger quantities at a time, delivering the herring singly with the head turned in one direction at a speed of about 2 per second, or about 30 barrels per hour.

"It is clear that this machine could facilitate the production of headed herring, and as the machine is small and cheap several of them can be set up parallel for increased capacity. . . . It can also be adjusted to filleting machines, but experiments have not yet been made in this field. The turning of the belly would have to be 100 percent certain in that case, and we expect further studies will be required."

Note: Also see Commercial Fisheries Review, July 1956, p. 85.



RECENT DEVELOPMENTS IN FISHERIES: Shrimp: This year the Gulf of Panama pink shrimp came in with the cold tides around the end of February, remained throughout March, and then left as quickly as they had appeared. Fishing for pink shrimp lasted 30 days. Because of lower prices and a dull market for pink shrimp, it was necessary to peel and devein more than half of the total catch.

The principal company (which owns about 50 shrimp trawlers and operates 10 more independent trawlers) in Panama exported to the United States in March 1956

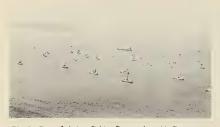


Fig. 1 - Part of shrimp fishing fleet anchored in Panama Bay.



Fig. 2 - Bella Vista Pier and several shrimp trawlers in foreground. Taboga Island can be seen in the distance.

a total of 436,200 pounds of frozen shrimp. Included was 107,800 pounds of heads-off (average 26-30 count) pink shrimp and 102,800 pounds of peeled and deveined



Fig. 3 - Unloading a shrimp trawler at Bella Vista Pier



Fig. 4 - Another view of Bella Vista Pier with freezing plant in background.

pink shrimp. The balance of the exports consisted of white shrimp and a small quantity of peeled and deveined "titi" (Xiphopeneus kroyeri).

The Panamanian pink shrimp have been classified by an FAO technical advisor as Peneus creviroctris and the jumbo white shrimp as Peneus occidentalis.

<u>Corvina</u> <u>Fillets</u>: Frozen corvina (<u>Cynoscion stlozmanni</u>) fillets are going over very well in Panama and the Canal Zone. Up to August about 6,000 pounds a month were marketed, and after August sales were expected to reach 10,000 pounds a

month because there were plans of supplying frozen corvina fillets to United States Army installations in the Canal Zone,



Fig. 5 - Shrimp in a brine-freezer tank aboard a Panamanian shrimp trawler.



Fig. 6 - Shrimp trawler tied up at Bella Vista Pier. Truck leaving pier loaded with shrimp.



Fig. 7 - Removing frozen shrimp from freezers at Bella Vista plant.

<u>Dried Fish:</u> One company in Panama has installed fish driers which will be capable of producing 5,000 pounds of dried corvina a day. This should more than take care of the local requirements for dried fish. About one million pounds of dried cod ("bacalao") a year is imported by Panama at present.

<u>Fish Cannery:</u> Plans for a fish cannery are still under discussion. The location of the canery has not been decided upon as some favor Panama and others



Fig. 8 - Two new shrimp trawlers built in Panama.



Fig. 9 - Taboga Island showing construction and dirt movement in the foreground, (Photo taken the latter part of 1955,)

nearby Taboga Island. The projected cannery is expected to start out on a small scale and pack about 5,000 cans of fish a day to supply the local market. Later the cannery hopes to work out plans to buy frozen tuna and attempt to launch its own brand of canned tuna in the Central American market.

Byproducts Plant: The fishery byproducts reduction plant at Taboga Island is expected to be finished and operating about September. The plant can process 12 metric tons of raw fish an hour. It has not yet been determined the type of fish which will be processed.

--Carlos A. Arosemena L., Panama City, Panama (June 22, 1956)



Peru

WHALING ACTIVITIES: The Peruvian-Panaman-French Company which obtained a license in 1955 to use the whole quota of 2,100 sperm whales made available by the generally-unrecognized South Pacific Conservation Agreement during the year July 1, 1955, to June 30, 1956, has disbanded without ever operating. The quota applies only to pelagic whale hunting (i.e. deep-sea).

However, two shore-based companies not subject to quotas continued to kill sperm whales and a very small number of fin whales.

In June 1956 the Secretary General of the signatories of the South Pacific Conservation Agreement issued a public invitation to apply for permits for the 1956/57 quota. No whaling companies, either foreign or local (i.e. Chilean, Peruvian, or Ecuadorean) are likely to apply for the license while the shore-based companies enjoy special advantages. A new shore-based company has been formed with a capital of US\$400,000 and will probably begin operating in 1956; its base will be at Tierra Colorado, just south of Paita. This company, like the other two, will kill sperm whales almost exclusively and will use no factoryship, announces a June 26 United States Embassy dispatch from Lima.



Union of South Africa

FISHING BOATS OFFERED NYLON PROPELLERS: Fishing boat owners of South Africa are showing some interest in a European-manufactured propeller made from nylon, states the April 1956 issue of The South African Shipping News and Fishing Industry Review. The nylon propeller has not only survived the most arduous tests, but its manufacturers claim that it has a number of advantages over the conventional metal propeller.

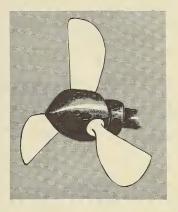
This remarkable innovation to boat propulsion was developed by technicians with nearly 40 years of experience in the development of the once startling, but now commonplace variable-pitch propeller.

After the war, when nylon was being adapted for more and more uses, a Danish firm making variable-pitch propellers was asked if it was possible to make a propeller of nylon. They examined the project and decided that it was possible if the special properties of nylon were considered.

The blades were molded to a rather rounded shape on the fore edges, something like the flippers of a small whale, and a small three-blade fixed propeller was made

and tried out. It worked well and stood the tests which included running in a tub full of wood blocks and fitting it to a boat which ran it at full speed against a stony beach. The only damage consisted of a few small hacks on the blades. Realizing the advantage of a tough resilient propeller with little friction between it and the water in which it revolved, they decided to try it on variable pitch. Again it worked and so nylon propellers are now being offered to fishermen.

Among the many advantages claimed by the manufacturers are resistance to cavitation and sufficient flexibility to absorb shocks without breaking. The propellers, made of a completely inert substance, will not corrode and so might offer a solution to the problems of boats in Walvis Bay waters. These propellers, both left and right hand, are supplied with variable pitch or standard fixed type.



The manufacturing firm has now gone beyond experiments with the smaller fishing boat propeller and is now working on propellers for a 150-hp, trawler engine.



U. S. S. R.

FISHING FLEETS EXPANDING FOR DISTANT-WATER FISHING: The Russian fleet of large ocean trawlers or factoryships will be increased to 50 during the sixth five-year plan running from 1956 to 1960, according to Norwegian journalists who recently visited Russia and talked with Russian Fishery Minister Isjkov. The trawlers are equipped with freezing and filleting machinery and use a stern slipway for hauling the trawls. The first group of 14 trawlers have a cargo capacity of 600 metric tons each, carry 100 men, have 1,900-horsepower engines, and fish for both cod and herring, according to reports in the Norwegian fishery journals Fiskets Gang (June 21) and Fiskaren (May 30).

Since the trawlers are too large to go through the White Sea Canal, they must go back and forth along the Norwegian Coast between Tallin and Leningrad in the Baltic Sea and Murmansk and Archangel in the North.

The Russian herring fleet off the Norwegian coast was reported to number 300 units. Fifty vessels have conducted extensive herring research and now know exactly the herring migrations from Norway to the Baltic Sea and Murmansk.

In further conversations with Russian Rear Admiral Burkhanov, Director for the Administration of the Northern Sea Routes and Viceminister for the Ocean Fleet, it was reported that there are five Arctic weather observatories supplemented by smaller coastal stations and four floating icefield stations. The stations make the usual meteorological observations, conduct ocean research and other research in connection with navigation. The Northern Sea route is now kept open 3 to 4 months each year, but the goal of the sixth five-year plan is to increase this to 5 to 6 months.

This will be accomplished with the regular icebreakers. An icebreaker with atomic engines will be tested during the five-year plan but cannot be set into operation until after 1960. The longer navigating season will be of considerable importance to the Soviet fisheries since it will then be possible to shift the new trawler fleet back and forth between the North Atlantic and the North Pacific to areas where the fishing potential is the greatest

ing potential is the greatest. Note: See Commercial Fisheries Review January 1955, p. 69; April 1955, p. 75; June 1955, p. 91; July 1955, p. 72; October

1955, p. 83; and December 1955, p. 64.

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HERRING AND CARP CAUGHT WITH SUCTION HOSE: Herring and carp are pumped directly into Russian fishing vessels in the Caspian Sea, according to an executive of the Norwegian Fishermen's Association who witnessed the operation while visiting Russia as a member of a Norwegian fishery delegation. He reported to Fiskaren (May 30), a Norwegian fishery journal, that a hose is lowered to a depth of 100 meters. A strong lamp is attached to the end of the hose. When an echo sounder indicates that fish have been drawn to the hose by the lamp, they are pumped into the boat.

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FISH PRESERVED BY ELECTRICAL SHOCK: An electric shock is used to preserve some fish for marketing in Russia, according to an executive of the Norwegian Fishermen's Association while visiting Russia as a member of a Norwegian fishery delegation. He reported to <u>Fiskaren</u> (May 30), a Norwegian fishery periodical, that the fish in well boats were stunned with an electrical shock and then placed in crushed ice in barrels. Even after being in transit 2 or 3 days the fish could be sold as living fish.



United Kingdom

GRIMSBY TO HOLD FISHING INDUSTRY EXHIBITION: A Grimsby Fishing Industry Exhibition was scheduled to be held September 1-8, 1956, in celebration of the Centenary of the opening of the first Fish Dock at that port. The Exhibition was to portray the size and scope of the fishing industry at Grimsby which ranges from the largest distant-water trawlers to inshore fishing vessels. All aspects of the fishing industry was to be covered.

To commemorate the event, social and other functions are being arranged during Centenary Week in Grimsby, one of the largest fishing ports in the world.



Venezuela

TUNA LONG-LINER RETURNS TO JAPAN: The Japanese long-line tuna vessel Bozo Maru, which started to fish experimentally for tuna off Venezuela about December 14, 1955, returned to Japan on June 2, according to a Venezuelan press report of May 31. The vessel returned to Japan with 200 tons of frozen tuna. The results of the Venezuelan venture are now being studied with a view to forming a joint Venezuelan-Japanese company to bring four Japanese vessels, of the same type as the Bozo Maru, to Venezuela in November 1956.

The 200 tons of tuna taken to Japan were said to be for the purpose of studying the canning characteristics of these tuna. Other reports indicate that the tuna were

unsalable in Venezuela due to the absence of canning facilities and lack of appeal to the Venezuelan consumer. Some attempts were made to sell the tuna at retail for as low as US\$0.22, but apparently the Venezuelan consumer preferred to pay about US\$0.74 for red snapper at retail.



MORE GLAMOROUS AND ECONOMICAL FISHERY PRODUCTS ON THE WAY

A new day is dawning for the American housewife as far as her food problems go; new, more glamorous, and economical foods are on their way to her in fishery products.

This was the prediction made on April 18, 1956, by Frank W. Wilkisson, of New York, upon election as president of the National Fisheries Institute, at its Eleventh Annual Convention in Miami Beach, Fla.

"The fisheries business is growing out of its swaddling clothes so far as knowing and appealing to the housewife and her family," said Wilkisson. "While fish products have been part of the American menu since the founding of our nation, it is only in the past few years that we have realized that our products can be merchandised and sold to the consumer in new and more effective ways.

"There was a time when fisheries foods were largely consumed on the nation's coasts. But that day is rapidly passing. Today the housewife can get varieties of our products in the innermost sections of the nation; brought to her in the most modern methods of refrigeration.

"Fish products have always been glamorous in the eyes of the American people. We have managed to preserve their glamor at the same time developing newer and more attractive ways of preparation and presentation. Not only is this true in precooked fish such as fish sticks, but it is also true of fresh fish products."

Wilkisson said that Americans are eating morefishery products than ever before and he anticipates that increased consumption will continue for some years to come, because the housewife is always looking for new, economical, and glamorous foods to serve her family and fish products offer all three.

At the same time, hotels and restaurants are finding increasing demand for fishery products, he said. Americans are eating out and they are getting a thorough sampling job done on them on fish and seafoods because of the large place hotels and restaurants are giving to these items on their menus.

Asked about the long-range situation on availability of fish products, Wilkisson said he cannot foresee any shortage for years to come. The problem of fishing rights off the coasts of nations is giving the industry some concern at the moment, he pointed out, but added he felt sure these problems would be worked out through conference and arbitration without causing any hardship on the processors or retailers of the products.

--Excerpt from address at National Fisheries Institute Eleventh Annual Convention, April 18, 1956.



Department of Agriculture

FISH-STICK STANDARD ESTABLISHED:

Through the combined efforts of the commercial fishing industry, the Department of the Interior, and the Department of Agriculture, quality standards that



Recording score for quality factors of fish sticks.

proved so valuable as a marketing aid for agricultural products will soon become available for fish and fishery products, Secretary of the Interior Fred A. Seaton announced July 25.

Official notice of final rule making for voluntary United States standards for grades for frozen fried fish sticks were published in the Federal Register of July 21, 1956. The standards will become effective on August 20, 1956.

Funds made available by Public Law 466, 83rd Congress, commonly referred to as the Saltonstall-Kennedy Act, have been used to expedite the program of the U, S. Fish and Wildlife Service for the development of voluntary Federal standards. The National Fisheries Institute, acting as a contract research agency for the Fish and Wildlife Service, has supplied the industry liaison essential to the standards program and has supplied

consulting services at meetings and conferences on standards. A committee of industry technologists, representative of fish-stick producers and distributors, actively cooperated with the Service's scientific staff in the studies of frozen fried fish sticks (selected as the product of highest priority by the fishing industry) and of processing procedures required to insure development of realistic and practical standards. The Department of the Interior has developed the standards program for fish and fishery products and conducted research required to develop or revise the standards.

When the standards become effective, the Department of Agriculture will offer an inspection and certification service on a fee basis upon request by any financially-interested party. Such inspections will aid in quality control and in facilitating marketing of the products.

The standards for frozen fried fish sticks apply to whole, rectangular-shaped portions of fish meat, breaded, precooked and frozen. The grades include "U. S. Grade A" and "U. S. Grade B." Quality below these grades would be classified as "Substandard."

Products to be graded must conform to the industry-accepted definition of the product. The most important elements of the definition require that only one species of fish be used in a package, that the fish meat be composed of fillet portions, and that the product consist of at least 60 percent by weight of fish meat.

The standards do not define proper labeling nomenclature for this product. Frozen fried fish sticks, when sold in interstate commerce, must conform to the labeling regulations of the Food and Drug Administration, Department of Health, Education, and Welfare.

The standard as published in the Federal Register follows:

TITLE 7-AGRICULTURE

Chapter I-Agricultural Marketing Service (Standards, Inspections, Marketing Practices), Department of Agriculture

PART 52-PROCESSED FRUITS AND VEGETA-BLES, PROCESSED PRODUCTS THEREOF AND CERTAIN OTHER PROCESSED FOOD PROD-

SUBPART-UNITED STATES STANDARDS FOR GRADES OF FROZEN FRIED FISH STICKS

On April 26, 1956, a notice of proposed rule making was published in the FED-ERAL REGISTER (21 F. R. 2687) regarding a proposed issuance of United States Standards for Grades of Frozen Fried Fish Sticks.

After consideration of all relevant matters presented, including the proposal set forth in the aforesaid notice, the following United States Standards for Grades of Prozen Fried Fish Sticks are hereby promulgated pursuant to the authority contained in the Agricultural Marketing Act of 1946. (60 Stat. 1087, et seq., as amended; 7 U. S. C. 1621 et seq.)

PRODUCT DESCRIPTION AND GRADES

52.3141 Product description.

52.3142 Grades of frozen fried fish sticks.

WEIGHTS AND DIMENSIONS

52.3143 Recommended weights and dimensions.

FACTORS OF QUALITY

52.3144 Ascertaining the grade for frozen fried fish sticks. 52.3145 Ascertaining the score for the fac-

tors which are rated. 52.3146 Appearance.

52.3147 Defects. 52.3148 Character.

DEFINITIONS AND METHODS OF ANALYSIS

52.3149 Definitions and methods of analysis.

LOT CERTIFICATION TOLERANCES

52.3150 Tolerances for certification of officially drawn samples.

SCORE SHEET

52.3151 Score sheet for frozen fried fish sticks.

AUTHORITY: [§ 52.3141 to 52.3151 immed under sec. 205, 60 Stat. 1099, as amended; 7 U. S. C. 1624.

PRODUCT DESCRIPTION AND GRADES

§ 52.3141 Product description, Frozen fried fish sticks are clean, wholesome, rectangular-shaped portions of breaded, pre-cooked, and frozen fish flesh. The portions of fish flesh, composed primarily of large pieces, are coated with a suitable batter and breading; are cooked by frying in suitable oil or fat; and are frozen in accordance with good commercial practice and maintained at temperatures necessary, for the preservation of the product. Frozen fried fish sticks contain not less than 60 percent, by weight, of fish flesh. All sticks comprising an individual package are prepared from the flesh of only one species of fish.

§ 52.3142 Grades of frozen fried fish

of frozen fried fish sticks that possess a have been properly prepared, used, and good flavor and odor, that possess a good appearance, that are practically free from defects, that possess a good character, and that for those factors which are rated in accordance with the scoring system outlined in this subpart the total score is not less than 85 points: Provided, That the frozen fried fish sticks may possess a reasonably good appearance and a reasonably good character if the total score is not less than 85 points.

(b) "U. S. Grade B" is the quality of frozen fried fish sticks that possess a reasonably good flavor and odor, that possess a reasonably good appearance, that are reasonably free from defects, that possess a reasonably good character, and that for those factors which are rated in accordance with the scoring system outlined in this subpart the total score is not less than 70 points: Provided, That the frozen fried fish sticks may fail to possess a reasonably good appearance and fail to possess a reasonably good character if the total score is not less than 70 points.

(c) "Substandard" is the quality of frozen fried fish sticks that fail to meet the requirements of U.S. Grade B.

WEIGHTS AND DIMENSIONS

§ 52.3143 Recommended weights and dimensions. The recommended weights and dimensions of frozen fried fish sticks are not incorporated in the grades of the finished product since weights and dimensions, as such, are not factors of quality for the purposes of these grades. It is recommended that the largest dimension of a fish stick be at least three times that of the next largest dimension and that the average weight of the individual sticks be not less than 3/4 ounce and not greater than 11/4 ounces.

PACTORS OF OURTITY

§ 52.3144 Ascertaining the grade-(a) General. In addition to considering other requirements outlined in the standards, the following quality factors are evaluated in ascertaining the grade of the product:

(1) Factor not rated by score points. (i) Fiavor and odor.

(2) Factors rated by score points. The relative importance of each factor which is rated is expressed numerically on the scale of 100. The maximum number of points that may be given such factors are:

Factors: Appearance ______ 35 Character ____ Total score

(b) The grade of frozen fried fish sticks is ascertained by observing the product in the frozen state and after it has been heated in a suitable manner.

(c) Good flavor and odor. "Good flavor and odor" means that the product has the good flavor and odor of properly prepared breaded fish sticks. The flesh sticks. (a) "U.S. Grade A" is the quality portion has the good flavor and odor of Compliance with these standards does not properly prepared fish of the particular secuse failure to comply with the provisions of the Pederal Food, Drug, and Commette Act. and odor obtained when all components

maintained. The product is free from rancidity, bitterness, and staleness, from bacterial spoilage flavors and odors, and from off-flavors and off-odors of any kind.

(d) Reasonably good flavor and odor. "Reasonably good flavor and odor" means that the product may be somewhat lacking in good flavor and odor, but is free from rancidity and from obfectionable bacterial spoilage flavors and odors, and from off-flavors and off-odors of any kind.

§ 52.3145 Ascertaining the score for the jactors which are rated. The essential variations within each factor which is rated are so described that the value may be ascertained for each factor and expressed numerically. The numerical range within each factor which is rated is inclusive. (For example, "21 to 25 points" means 21, 22, 23, 24, or 25 points.)

§ 52.3146 Appearance—(a) General. The factor of appearance refers to the uniformity of size and shape of the frozen sticks, the color of the heated sticks, and the continuity of the coating

of the product after heating.
(b) (A) classification. Prozen fried fish sticks that possess a good appearance may be given a score of 30 to 35 points. "Good appearance" means that the sticks are practically uniform in size and shape; that the product after heating possesses a practically uniform light brown to golden brown color or reddish-brown color characteristic of properly prepared frozen fried fish sticks; and that the sticks, after heating, possess a continuity of the coating not more than slightly affected by cracking or slipping.

(c) (B) classification. Frozen fried fish sticks that possess a reasonably good appearance may be given a score of 25 to 29 points. "Reasonably good appear». ance" means that the sticks are reasonably uniform in size and shape; that the product after heating possesses a reasonably uniform light brown to golden-brown color or reddish-brown color characteristic of properly prepared frozen fried fish sticks; and that the sticks, after heating, possess a continuity of the coating not materially affected by cracking or slipping.

(d) (SStd.) classification. fried fish-sticks which fail to meet the requirements of paragraph (c) of this section may be given a score of 0 to 24 points, and shall not be graded above U. S. Grade B regardless of the total score of the product (this is a partial limiting rule).

§ 52.3147 Defects-(a) General. The factor of defects refers to the degree of freedom from bones, broken sticks, damaged sticks, and from blemishes.

(1) Bones. "Bones" means any bones that can be separated from the product, can be identified, and are of such character as to be potentially harmful.

(2) Broken stick, "Broken stick". means a fish stick which is separated in two or more parts or is strained apart to the extent that it cannot be readily handled as one stick.

(3) Damaged stick. "Damaged stick" means a fish stick which has been crushed or otherwise mutilated to the extent that its appearance is materially affected.

(4) Blemished. "Blemished" means the presence (in or on the fish flesh) of blood spots, bruises, skin, protein curd spots, and objectionable dark layer fat, and (on or in the coating) of burned material, dark carbon specks, and other

harmless extraneous material.

(b) Seriously blemished. "Seriously." blemished" means blemished to the extent that the appearance is seriously affected.

(b) (A) classification. Frozen fried fish sticks that are practically free from defects may be given a score of 34 to 40 points. "Practically free from defects" means that:

(1) None of the sticks are broken; (2) The sticks may be blemished to

only a minor degree; and

(3) Not more than a total of 20 percent, by count, of the sticks may be damaged or contain bones: Provided. That bones may be present in not more than 10 percent, by count, of all the sticks.

- (c) (B) classification, Frozen fried fish sticks that are reasonably free from defects may be given a score of 28 to 33 points. Prozen fried fish sticks that fall into this classification may not be graded above U. S. Grade B regardless of the total score for the product (this is a limiting rule). "Reasonably free from defects" means that not more than a total of 30 percent, by count, of the sticks may be defective because of bones, or are damaged sticks, broken sticks, or seriously blemished sticks: Provided, That
- (1) Not more than 10 percent, by count, may be broken sticks;

(2) Not more than 30 percent, by count, may be damaged sticks;

- (3) Not more than 20 percent, by count, of the sticks may contain bones; and
- (4) Not more than 10 percent, by count, of the sticks may be seriously blemished.

(d) (SStd.) classification. Frozen fried fish sticks that fail to meet the requirements of paragraph (c) of this section may be given a score of 0 to 27 points, and may not be graded above substandard regardless of the total score for the product (this is a limiting rule).

§ 52.3148 Character - (a) General. The factor of character refers to the presence or absence of free oil in the package and its effect on the condition of the package; the ease of separating the frozen sticks without damaging the coating or breaking the sticks; the tendency of the sticks to remain whole and unbroken when they are heated, handled, and served in the normal manner; the degree of freedom of the breading from either an oiliness or crumbliness; the tenderness and moistness of the flesh; the consistency of the breading in the heated product; and the adherence of the coating of the heated

(b) (A) classification. Frozen fried fish sticks that possess a good character may be given a score of 21 to 25 points, "Good character" means that oil from the product does not more than slightly

damage the package; that there may be + heating in accordance with the recompresent not more than a very small amount of loose breading in the package; that the sticks may be separated easily; that the sticks are not more than very slightly damaged by the normal handling incident to heating and serving; that no excess oil remains on the cooking utensil; that the breading is not more than slightly oily; that the flesh after heating has a good texture which is firm, tender and moist, characteristic of properly fried fish sticks for the species used; and that after heating the coating has a good crisp, tender texture not more than slightly affected by blistering or wrinkling.

(c) (B) classification. Frozen fried fish sticks that possess a reasonably good character may be given a score of 17 to 20 points. "Reasonably good character" means that oil from the product does not materially damage the package; that there may be present not more than a reasonable amount of loose breading in the package; that the sticks may be separated with only moderate damage to the coating; that the sticks are not more than moderately damaged by the normal handling incident to heating and serving; that the breading is not more than moderately oily; that the flesh after heating has a reasonably good texture which is not more than moderately tough, stringy, crumbly, mushy or spongy; and that after heating the coating has a reasonably good texture which may be not more than moderately pasty, mushy, tough, or crumbly and is not materially affected by blistering or wrinkling.

(d) (SStd.) classification, Frozen fried fish sticks that fail to meet the requirements of paragraph (c) of this section may be given a score of 0 to 16 points and shall not be graded above U.S. Grade B regardless of the total score for the product (this is a partial limiting rule).

DEFINITIONS AND METHODS OF ANALYSIS

§ 52.3149 Definitions and methods of analysis—(a) Percent of fish flesh, "Percent of fish flesh" means the percent, by weight, of fish flesh in an indi-vidual package as determined by the following method:

(1) Equipment needed, (i) Water

bath (2 to 3 liter beaker).

(ii) Balance, accurate to 0.05 gm.

(iii) Paper towels. (iv) Spatula, small with curved tip,

(2) Procedure. (i) Remove from 0° F. storage and obtain the weight of each stick in the package while still in a hard frozen condition.

(ii) Place each stick individually in the water bath (maintained at 17° to 30° C.—63° to 86° F.) and allow to remain for 25 seconds. Remove from the bath; blot off lightly with double thickness paper toweling; scrape off coating with spatula; and weigh the fish flesh portion of the stick.

(iii) Calculate the percent of fish flesh in the package by the following formula:

Total weight of fish flesh Total weight of frozen sticks ×100 = percent fish flesh.

(c) Heating in a suitable manner. "Heating in a suitable manner" means

mendations accompanying the product. However, if specific instructions are lacking, the product should be heated as follows:

- (1) Place the product while still in the frozen state on a flat or shallow pan of sufficient size that at least 10 ounces of the product can be spread evenly on the pan with no portion of a stick closer than 1/4 inch to another or to the edge of the pan.
- (2) Place the pan and frozen contents in a properly ventilated oven pre-heated to 400 degrees Fahrenheit and remove when the product is thoroughly heated.

LOT CERTIFICATION TOLERANCES

§ 52.3150 Tolerances for certification of officially drawn samples. (a) The grade of a specific lot from which samples have been officially drawn may be certified on the basis of such samples: Provided, That (1) all packages contain one species of fish; (2) all packages meet applicable provisions of the Federal Food, Drug, and Cosmetic Act in effect at the time of the aforesaid certification; And provided further. That, with respect to those factors which are rated by score points, such grade will be determined by averaging the total scores, if:

(i) Not more than one-sixth of the packages fail to meet the grade indicated by the average of such total scores;

(ii) None of the packages fall more than one grade below the grade indicated

by the average of such total scores; and (iii) The average score of all packages for any factor subject to a limiting rule is within the score range of that factor for the grade indicated by the average of the total scores of the packages comprising the sample.

SCORE SHEET

§ 52.3151 Score sheet for frozen fried fish sticks



¹ Indicates partial limiting rule.
² Indicates limiting rule.

Effective time. The United States Standards for Grades of Frozen Fried Fish Sticks (which is the first issue) contained in this subpart shall become effective 30 days after publication hereof in the FEDERAL REGISTER.

Dated: July 18, 1956.

[SEAL] FRANK E. BLOOD Acting Deputy Administrator, Marketing Services.

Department of the Interior

FISH AND WILDLIFE SERVICE

FISH AND WILDLIFE SERVICE REORGANIZATION DEFERRED PENDING CONGRESSIONAL ACTION:

Because Congress is considering legislation affecting the Fish and Wild-life Service, administrative reorganization of that Service, scheduled to go into effect July 1, was temporarily deferred, with the President's approval, Secretary of the Interior Fred A. Seaton announced July 3.

The Department has been working out details of the reorganization plan since June 4, when a White House directive spelled out the objectives of the Administration's proposal to provide new forms of assistance to the commercial fishing industry and to bolster other services performed by the Fish and Wildlife Service.

Secretary Seaton said the Department had decided to postpone completion of the reorganization until Congress has had an opportunity to act on pending legislation designed to accomplish essentially the same things as the administration's program.

The Secretary said H.R. 11570 is generally in accord with the President's program.

"In view of the fact that the Congress is now considering legislation that would, among other things, provide for the reorganization of the Fish and Wildlife Service to include a bureau of wildlife and sport fishing and a bureau of commercial fisheries, it would seem best at this time for the Department to delay effectuating its own reorganization plan beyond the originally contemplated July 1 target date," Seaton said.

"This is a complex problem and it is the President's desire that the Department of the Interior and other interested Federal agencies cooperate to the utmost with the Congress in working out the best possible solution to the problem," he added.

In addition to providing for reorganization of the Fish and Wildlife Service. H.R. 11570, as reported by the House Committee on Merchant Marine and Fisheries, calls for establishment within the Department of the Interior of an Assistant Secretary to have supervision of fisheries and wildlife and a Commissioner of Fish and Wildlife. Other significant features of the bill are a revolving loan fund and a continuation of the Saltonstall-Kennedy program which would eliminate the present \$3,000,000 limitation on funds for fisheries research and other projects. The Saltonstall-Kennedy Act of 1954 is due to expire next year.

The administration's proposed legislation, submitted to Congress on June 7 provided for a \$10,000,000 revolving loan fund for the maintenance and repair of commercial fishing vessels and for liberalization of the Saltonstall-Kennedy Act.

* * * * *

NOTICE OF INTENTION TO ADOPT AMENDMENTS TO ALASKA COMMERCIAL FISHERIES REGULATIONS:

Notice of intention to adopt amended regulations permitting and governing the time, means, and methods for taking commercial fish and shellfish in waters of Alaska was published in the Federal Register of July 18, 1956. The regulations are to become effective beginning about February 1, 1957, and to continue in effect thereafter until further notice.

Interested persons may participate in considering changes in the regulations by submitting their views, data, or arguments in writing to the Director of the Fish and Wildlife Service, Department of the Interior, Washington 25, D. C., on or before November 20, 1956, or by presenting their views at a series of open discussions scheduled as follows:

Dillingham, Alaska--October 1, 1956 Anchorage, Alaska--October 3, 1956 Homer, Alaska--October 4, 1956 Kodiak, Alaska--October 6, 1956 Cordova, Alaska--October 8, 1956 Juneau, Alaska--October 15, 1956 Sitka, Alaska--October 16, 1956 Ketchikan, Alaska--October 18, 1956 Wrangell, Alaska--October 19, 1956 Seattle, Wash.--November 7, 8, and 9, 1956

The hour and place of each meeting will be announced by the local representative of the U.S. Fish and Wildlife Service at the places indicated.

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PROPOSED REVISED REGULATIONS FOR NEW ENGLAND HADDOCK FISHERY

The text of new regulatory provisions to provide for the registration of vessels to be used in the taking of haddock within



Subarea 5 of the Northwest Atlantic Ocean is contained in a notice of proposed rule making published by the Department of the Interior in the June 12 issue of the Federal Register.

Subarea 5 is an area of the high seas lying off the coast of New England and is one of five separately-described areas of the high seas covered by the International Convention for the Norwest Atlantic Fisheries, signed at Washington, February 8, 1949. Vessels registered for use in the haddock fishery will be

These regulations are designed to give effect to a proposal adopted in 1952 by the International Commission for the Northwest Atlantic Fisheries which recommended that the contracting governments take appropriate action to prohibit the taking of haddock in Subarea 5 with a trawl net having a mesh size of less than 4½ inches. This recommendation was made in the interest of permitting an adequate escapement of immature haddock which, in turn, would contribute materially toward increasing the level at which the maximum sustainable catch of this species might be maintained.

The Commission's recommendation was first implemented by regulations adopted by the Secretary which became effective May 31, 1953 (50 CFR Part 155, 18 F. R. 2414, April 24, 1953). These regulations were experimental in nature so far as they related to the size of the meshes of trawl nets and by their terms were to be effective for the year 1953 only. As an aid to enforcement, the regulations were made applicable to the entire convention area although the Commission's recommendation for mesh size restrictions applied only to

required to use trawl nets having a minimum mesh size of $4\frac{1}{2}$ inches.

The new regulations are to be adopted in the interest of more effective enforcement of a minimum mesh-size restriction which has been in effect since 1953. The mesh-size restriction was adopted in that year following a proposal by the ten-nation International Commission for the Northwest Atlantic Fisheries. Experience gained during three years of operations has indicated the desirability of effecting these changes which will be helpful in obtaining industrywide compliance with the requirements of the regulations.

For many years, prior to the adoption of the regulations, haddock fishermen using nets having an inside measurement as small as 27 inches caught haddock which were too small to be marketed. These small haddock were discarded at sea. The present regulations, based upon knowledge obtained through extensive research into the rates of growth and mortality of haddock, specifies a minimum mesh size of $4\frac{1}{2}$ inches inside measure which has the effect of permitting immature haddock to escape unharmed from the nets. Since adoption of the new fishing practices in 1953, biologists of the U.S. Fish and Wildlife Service estimate that several million pounds of young fish have been left in the sea each year for capture at a future time when they will have grown to a more desirable size.

Subarea 5. In addition to prohibiting United States fishermen from taking haddock in all of the subareas of the convention area with a trawl net having a mesh size of less than $4\frac{1}{2}$ inches, the regulations prohibited the possession or transportation on a vessel at any one time of both a prohibited trawl net and haddock in excess of 5,000 pounds or ten percent of all fish on board, whichever was larger. Late in 1953, a number of vessel operators were apprehended at Massachusetts ports and were charged with violating the regulations through possessing undersized trawl nets and haddock in excess of the exempted quantities. These cases subsequently were disposed of upon pleas of guilty or nolo contendere, resulting in fines ranging from \$15 to \$250.

Effective January 1, 1954 (18 F. R. 8903, December 31, 1953), revised regulations of unlimited duration were adopted to implement a second proposal recommended by the Commission relating to the taking of haddock in Subarea 5. These regulations continued the $4\frac{1}{2}$ -inch minimum mesh size restriction and prescribed a procedure for determining equivalent wet and dry mesh sizes. The

regulations also established a procedure under which trawl nets could be certified and approved by the Fish and Wildlife Service for use in haddock fishing. Although the regulations continued to apply to the entire convention area, the prohibition against the possession of haddock and an undersized net was eliminated because it was regarded as being merely a rule of evidence which, in the circumstances presented, probably exceeded the authority of the Secretary. Difficulties in proving violations arose under the amended regulations because several suspected violators had not been detected at sea using undersized nets and no means were available for establishing that small mesh nets had been used in taking haddock in quantities affected by the regulations. As a result, the criminal actions instituted against a number of vessel operators who had been apprehended upon arrival in port during the early part of 1954 were later dismissed because of the absence of evidence sufficient to obtain convictions.

In a memorandum, dated September 12, 1955, the Solicitor reviewed extensively the authority of the Secretary to prescribe regulations governing the taking of haddock in the Northwest Atlantic Ocean and concluded that in the light of the Commission proposals which thus far have entered into force the regulations cannot be made applicable to any waters beyond Subarea 5. He also concluded that no provisions designed to serve as a rule of evidence can be included in the regulations. In view of these conclusions and as a practical aid to effective enforcement, the Solicitor suggested that a licensing or registration system be prescribed by regulations as a means of determining those persons who fish for haddock in Subarea 5 and are thus amenable to regulation, including a prohibition against the possession of undersized trawl

The draft of proposed revised regulations as published in the June 12 Federal Register is designed to carry the suggestions of the Solicitor into effect. Significant proposed changes in and additions to the existing regulations are commented on below:

- Section 155.1 is largely self-explanatory and is retained as a part of the regulations to afford legal definitions for the terms used elsewhere in the regulations. These definitions follow closely those employed in the existing regulations. It should be observed, however, that the definition of "haddock fishing" has been enlarged to include "the outfitting and departure of a vessel for or the return of a vessel from haddock fishing." The inclusion of these acts will enlarge the basis for enforcement activities at ports within territorial waters involving haddock taken within Subarea 5 by registered haddock fishing vessels. Another significant change in \$155.1 is the inclusion of a definition of the "regulatory area" to delimit the boundaries of Subarea 5 of the convention area. When revised in accordance with the present proposals, these regulations will have application only to the taking of haddock in Subarea 5.
- 2. A major change in the regulations is represented by the addition of \$155.2. Subsection (a) of this section will require that persons who propose to engage in haddock fishing in Subarea 5 shall first register their vessels and obtain a haddock registration certificate by following the

- procedures specified in subsection (b). Subsection (c) of \$155.2 will require that the haddock registration certificate be carried on board the vessel for which it is issued and that the certificate, the vessel, its gear and equipment shall at all times be subject to inspection by officers authorized to enforce the regulations. The primary purpose of the registration requirement is to afford a means by which persons fishing for haddock in Subarea 5 may be distinguished from those who fish for haddock in nonregulated waters of the convention area or fish for species in Subarea 5 other than haddock.
- 3. (a) Section 155.3(a) would make it unlawful for any person to possess on board a registered haddock fishing vessel or to use or attempt to use from such vessel a trawl net having a mesh size of less than 4½ inches as determined in accordance with the methods of measuring fishing gear prescribed in subsections (b), (c) and (d) of \$155.3.
- (b) Subsection (d) would be amended to substitute "120-thread cotton" for the present "109thread cotton" to correct an error made when this subsection was adopted late in 1953. Moreover, all reference to nylon twine would be deleted from this subsection pending completion of studies by the Service to determine the behavior of cod ends constructed of nylon twine of various sizes. This change has become particularly important with the recent use of cod ends constructed from war-surplus braided nylon parachute cord. Depending upon a variety of factors in the use of these codends, the twine swells and "fuzzes up," becoming at least double the original diameter of the braided cord. This results in a mesh size considerably less than the 41-inch minimum permitted under the regulations. Certification and approval for haddock fishing should be discontinued on all nylon-thread cod ends until the Service is in a position to determine what dry mesh size will be equivalent to not less than four and one-half inches when wet after use.
- (c) The present subsection (f) of \$155.3 will be redesignated (g) and a new subsection (f) will have the effect of invalidating the seals attached by Service representatives to dry mesh cod ends certified and approved by them for use in haddock fishing whenever such cod ends are repaired, altered or otherwise modified subsequent to such certification. This additional provision is proposed for inclusion in the regulations to forestall any contention which otherwise might be made that a cod end having a seal attached is a net of approved mesh size notwithstanding the fact that the net has been materially altered subsequent to certification. In some instances, whole sections of cod ends have many times been replaced while leaving seals intact. No assurance can be had that "sealed" nets when so altered still produce the degree of selectivity contemplated by the $4\frac{1}{2}$ inch mesh restriction. The effect of the new subsection (f) will be to place cod ends which have been altered subsequent to certification in the same category as nets which have never been certified, thus placing responsibility upon the fisherman to insure that altered nets with seals remaining attached comply with the mesh-size restriction.
- 4. Section 155.4 prescribes a procedure under which the registration certificate issued for a fishing vessel may be suspended temporarily and thus permit gear having small meshes to be possessed

DEPARPMENT OF THE INTENIOR Flat and Mildlife Service ornic of the Mandows Inductive	SUSPENSIONS 1. Suspended for the period
Botton 11, Messachusetts HADOOCK REGISTRATION CERTIFICATE The vessel, orficial number, home port, owned by,	Signature and title of officer suspending 2. Suspended for the period
and operated by	Signature and title of officer suspending 3. Suspended for the period
signed at Meshington, Pebruary 8, 1949, for the period, 19_ through December 31, 19 The following previsions of Part 155, Title 50, Code of Pederal Regula- tions, are quoted for the information of the operator of the vessel:	Signature and title of officer suspending b. Suspended for the period
"5 15.5(c) The haddook registration certificate so issued by the Fish and Wildlife Service shall be carried so board the vessel for which it is issued at all times and such certificate, the vessel, its goar and equipment shall at all times be subject to imagerican by officers materiated to enforce the regulations in this part." "5 15.5.2 Registrations on fiching near. "5 15.5.2 Registrations on fiching near. (a) No person shall possess at	Signature and title of officer suspending
any time on board a vessel for which a haddoot registration certificate is in force, or use or attempt to use from such vessel, a trum, har or mets, parts of mets or metiting having a menh site of less than four and one-half inches as defined in (mobiling having a menh site of less than four and one-half inches as defined in (mobiling having half). (a) and (a) of this section." "§ 155.h Tumnorar sustension of haddoot resistantion certificates. (a) The owner or operator of any finding vessel which is proposed to be	5. Suspended for the period to Signature and title of officer suspending
used in haddook fishing beyood the limits of the regulatory area or is pro- posed to be used in fishing withing such area for species of find other than haddook, may obtain a temporary suspension of the haddook registration cer- tificate issued for such vessel for the specified period during which such nonregulated fishing is to be combareds. "(b) Pemporary suspension of haddook registration certificates shall	6. Sumpended for the period to
be granted upon oral or written request, specifying the period of suspension desired, by an authorised officer of one of the Following aspecies: Hab and Wildlife Service, Coast Dazed, Bureau of Austras, and Pest Office Department. Such officer shall make appropriate candroment on the certi- ficate from evidenting the durention of its suspension.	Signature and title of officer suspending 7. Suspended for the period
Signature of vessel (owner) (operator) (date)	Signature and table of officer suspending 8. Suspended for the period
Regional Director (date) [SDE REVERSE]	Signature and title of officer suspending

Front and back of proposed Haddock Registration Certificate.

on and used from a vessel when a person desires to engage in haddock fishing outside of Subarea 5 or to fish within that area for species of fish other than haddock. During the period covered by the temporary suspension of the haddock registration certificate the vessel affected by the suspension would not be engaged in haddock fishing within the meaning of these regulations and there would be no bar to the possession or use of fishing gear having a mesh size less than the prescribed minimum of $4\frac{1}{2}$ inches. It is to be understood, of course, that during the period of certificate suspension the affected vessel could be used to take haddock only in convention waters outside the limits of Subarea 5 or for taking species of fish other than haddock within Subarea 5. Subsection (b) of this section contemplates that temporary suspensions of haddock registration certificates may be granted by authorized officers of any one of the following Federal agencies: Fish and Wildlife Service, Coast Guard, Bureau of Customs, and Post Office Department. Tentative assurances of cooperation in the performance of this limited function have been obtained through discussions with representatives of the agencies named which are not within this Department. These assurances will be reduced to writing before the revisions in the regulations are finally adopted.

5. Subsections (a), (b), and (c) of \$155.5 restate the exemptions presently contained in the haddock regulations and would continue to permit the persons and vessels therein described to possess and transport haddock without regard to the requirements of the regulations.

The text of the proposed regulations which appeared in the June 12 Federal Register follows:

DEPARTMENT OF THE INTERIOR |

Fish and Wildlife Service

I 50 CFR Part 155 1

NORTHWEST ATLANTIC COMMERCIAL FISHERIES

HADDOCK PROVISIONS

NOTICE OF PROPOSED RULE MAKING

Experience gained since the initial adoption of regulations effective May 31, 1953 (18 F. R. 2414), prescribing restrictions on trawling nets used in the taking of haddock in the Northwest Atlantic Ocean has demonstrated a need for further revisions in the regulations to make the same more effective.

In accordance with section 4 (a) of the Northwest Atlantic Fisheries Act of 1950, proposed amendments to the regulations were submitted to the Advisory Committee to the United States Commissioners on the International Commission for the Northwest Atlantic Fisheries on March 26, 1956, at which time the proposed revised regulations received the approval, in principle, of the Advisory Committee.

Notice is hereby given, pursuant to section 4 (a) of the Administrative Procedure Act of June 11, 1946 (60 Stat. 237), that the Secretary of the Interior proposes to adopt the regulations set forth in tentative form below to replace Part 155-Haddock Provisions. The proposed regulations to be issued under the suchority contained in section 7 (a) of the Northwest Atlantic Fisheries Act of 1950 (64 Stat. 1067; 16 U.S. C. 981), are as follows:

Meaning of terms.

Haddock registration certificates. 155.2 Restrictions on fishing gear.

Temporary suspension of haddock registration certificates. 155.4

155.5 Certain persons and vessels exempted.

AUTHORITY: §§ 155.1 to 155.5 issued under sec. 1, 64 Stat. 1067; 16 U. S. C. 981.

§ 155.1 Meaning of terms. used in the regulations in this part, unless the context otherwise requires, terms shall have the meanings ascribed hereinafter in this section.

(a) Regulatory area. The words "regulatory area" mean that portion of the Convention area, including all waters except territorial waters, bounded by a line beginning at the terminus of the international boundary between the United States of America and Canada in Grand Manan Channel at a point in 44°46'35.34" north latitude, 66°54'11.23" west longitude; thence due south to the parallel of 43°50' north latitude; thence due west to the Meridian of 67°40' west longitude; thence due south to the parallel of 42°20' north latitude; thence due east to a point in 66° west longitude; thence along a rhumb line in a south-easterly direction to a point in 42° north latitude 65°40′ west longitude; thence due south to the parallel of 39° north latitude; thence due west to the Meridian of 71°40' west longitude; thence due north to a point three miles off the coast of the State of Rhode Island; thence along the coasts of Rhode Island, Massachusetts, New Hampshire, and Maine at a distance of three miles to the point of heginning

(b) Haddock. The word "haddock" denotes any fish of the species Melanogrammus aeglefinus.

(c) Haddock fishing. The words "haddock fishing" mean and include (1) words attempted catching, taking or fishing for fish of the species Melanogrammus aeglefinus: and (2) the outfitting and departure of a vessel for or the return of a vessel from haddock fishing.

(d) Fishing vessel. The words "fishing vessel" denote every kind, type or description of watercraft or vessel subject to the jurisdiction of the United States used in or outfitted for catching or processing fish or transporting fish from fishing grounds.

(e) Trawl net. The words "trawl net" means any large bag net dragged in the sea by a vessel or vessels for the purpose of taking fish.

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(f) Cod end. The words "cod end" mean the bag-like extension attached to the after end of the belly of the trawl net and used to retain the catch.

§ 155.2 Haddock registration certificates. (a) No person shall engage in haddock fishing within the regulatory area nor shall any person possess, transport or deliver by means of any fishing vessel haddock taken within such area except under a haddock registration certificate issued and in force in conformity with the regulations in this part.

(b) The owner or operator of a fishing vessel may obtain without charge a haddock registration certificate by furnish-ing, on a form to be supplied by the Fish and Wildlife Service, information specifying the names and addresses of the owner and operator of the vessel, the name, official number and home port of the vessel, and the period for which the haddock registration certificate is de-The form shall be submitted, in sired. duplicate, to the Regional Director, Fish and Wildlife Service, Department of the Interior, Boston, Massachusetts, who shall grant the registration certificate for the duration specified by the applicant in the form but in no event to extend beyond the end of the calendar year during which the registration certificate is issued. New registration certificates shall similarly be issued to replace expired, lost or mutilated certificates. (c) The haddock registration certifi-

cate so issued by the Fish and Wildlife Service shall be carried on board the vessel for which it is issued at all times and such certificate, the vessel, its gear and equipment shall at all times be subject to inspection by officers authorized to enforce the regulations in this part.

§ 155.3 Restrictions on fishing gear. (a) No person shall possess at any time on board a vessel for which a haddock registration certificate is in force, or use or attempt to use from such vessel, a trawl net or nets, parts of nets or netting having a mesh size of less than four and one-half inches as defined in this section,

(b) As used in this section, the term "mesh size of less than four and one-half inches" shall mean (1) with respect to any part of the net except the cod end, the average size of any twenty consecutive meshes in any row located at least ten meshes from the side lacings measured when wet after use; and (2) with respect to the cod end, the average size of any row of meshes running the length of the cod end located at least ten meshes from the side lacings, measured when wet after use, or, at the option of the user, a cod end which has been approved, in accordance with paragraph (d) of this section, by an authorized representative

the catching, taking or fishing for or the 1 of the Director of the Fish and Wildlife Service, as having a mesh size when dry before use equivalent to not less than four and one-half inches when wet after

(c) All measurements of meshes when wet after use shall be made by the insertion into such meshes under pressure of not less than ten nor more than fifteen pounds of a flat wedge-shaped gauge having a taper of two inches in nine inches and a thickness of three thirty-seconds of an inch.

(d) For the purpose of approving dry cod ends before use, as contemplated by paragraph (b) of this section, the average mesh size of such cod ends shall be determined by measuring the length of any single row of meshes running the length of the cod end, parallel to the long axis of the cod end and located at least ten meshes from the side lacings, when stretched under a tension of two hundred pounds, and dividing the length by the number of meshes in such row: Provided, That not more than ten percent of the meshes in such row shall be more than one-half inch smaller when measured between knot centers than the average of the row. Cod ends so measured which are constructed of the twines and are of not less than the average mesh sizes specified in the table below may be approved for haddock fishing by any authorized employee of the Fish and Wildlife Service by the attachment to such cod end of an appropriate seal or seals.

Twine Average mesh size 4-ply 45-yard manila, 5.625 inches (5%''), double strand.

4-ply 50-yard manila, 5.625 inches (5%"). double strand.

4-ply 75-yard manila, 5.625 inches (5%"). double strand 4-ply 80-yard manila, 5.500 inches (51/2").

double strand. 120-thread cotton. 4.250 inches (41/4").

(e) The alteration, defacement of reuse of seals affixed to cod ends in accordance with this section is prohibited.

(f) The repair, alteration or other modification of cod ends to which seals have been affixed in accordance with this section shall invalidate such seals and such cod ends shall not thereafter be deemed to be approved for haddock fish-Nothing contained in this section shall preclude the continued use at the option of the user, of cod ends having invalidated seals affixed thereto: Provided. That such cod ends after repair, alteration or other modification shall continue to have a mesh size of not less than four and one-half inches as defined in paragraph (b) of this section.

(g) The use in haddock fishing within the regulatory area of any device or method which will obstruct the meshes of the trawl net or which otherwise will have the effect of diminishing the size of said meshes is prohibited: Provided, That a protective covering may be attached to the underside only of the cod end alone of the net to reduce and prevent damage thereto.

§ 155.4 Temporary suspension of haddock registration certificates. (a) owner or operator of any fishing vessel which is proposed to be used in haddock fishing beyond the limits of the regulatory area or is proposed to be used in

¹Form filed as part of original document. Copies available upon request to Fish and Wildlife Service, Department of the Interior, Washington 25, D. C.

fishing within such area for species of fish other than haddock, may obtain a temporary suspension of the haddock registration certificate issued for such vessel for the specified period during which such nonregulated fishing is to be conducted.

(b) Temporary suspension of haddock registration certificates shall be granted upon oral or written request, specifying the period of suspension desired, by an authorized officer of one of the following agencies: Fish and Wildlife Service, Coast, Guard, Bureau of Customs, and Post Office Department. Such officer shall make appropriate endorsement on the certificate form evidencing the duration of its suspension.

§ 155.5 Certain persons and vessels exempted. Nothing contained in the regulations in this part shall apply to:

(a) Any person who or vessel which, in (b) Any person who or vessel which, in haddock, takes and possesses a quantity of haddock not exceeding five thousand pounds, or ten percent of all fish on the vessel from which the fishing is conducted, whichever is the greater.

(b) Any person or vessel authorized by the Director of the Fish and Wildlife Service to engage in haddock fishing for

scientific purposes

(c) Any vessel documented as a common carrier by the Government of the United States and engaged exclusively in the carriage of freight and passengers,

Prior to the final adoption of the regulations set forth above, consideration will be given to any data, views or arguments relating thereto which are submitted in writing to the Director, Fish and Wildlife Service, Department of the Interior, Washington 25, D. C., within the period of thirty days from the date of publication of this notice in the FED-ERAR REGISTRO.

Dated: June 6, 1956.

Wesley A. D'EWART,
Assistant Secretary of the Interior.

* * * * *

HERRING QUOTA IN SOUTH-EASTERN ALASKA INCREASED.

On the basis of herring abundance, it has been determined that the quota in Southeastern Alaska, in other than the Cape Ommaney-Cape Bingham section, can be increased from 17,500 shorttons to 22,500 short tons. The Director of the U.S. Fish and Wildlife Service published this announcement in the Federal Register of July 20, 1956.

HIGH-SEAS FISHING FOR

SALMON OFF ALASKA PROHIBITED: In order to conserve the salmon runs of Alaska, fishing for salmon, except by

* * * * *

of Alaska, fishing for salmon, except by trolling, on the high seas of the North Pacific Ocean and the Bearing Sea adjacent to Alaskan waters by any "person or fishing vessel subject to the jurisdiction of the United States," is prohibited

by an order effective July 20, 1956.

This action is taken under authority of the North Pacific Fisheries Act of August 12, 1954. It is intended to prevent development of an



American high seas salmon fishery which would intercept the Alaskan salmon runs before they reach waters now under regulation. It has been demonstrated that salmon can be taken in commercial quantities on the high seas to such an extent that protective measures imposed within Alaskan waters could be nullified. This made the new prohibition necessary.

The United States section of the International North Pacific Fisheries Commission (established by convention between the United States, Canada, and Japan for the conservation of the fisheries resources of the north Pacific Ocean) requested that this restrictive action be taken. It also has the endorsement of the canning operators and fishermen of Alaska.

The restriction applies only to waters adjacent to the waters of Alaska. The term "waters of Alaska" north and west of the international boundary at Dixon Entrance is defined as including those extending three miles seaward (1) from the coast, (2) from lines extending from headland to headland across all bays, inlets, straits, passes, sounds and entrances, and (3) from any island or groups of islands, including the islands of the Alexander Archipelago, and the waters between such groups of islands and the mainland.

The North Pacific Area, where fishing will be prohibited, is defined to include all waters of the north Pacific Ocean and Bearing Sea north of Dixon Entrance and east of 175 degrees west longitude, exclusive of the "waters of Alaska." This is the "abstention line" east of which the Japanese have agreed to abstain from fishing for salmon, herring, and halibut,

as provided for in the convention. Attention is called to the fact that this prohibition does not extend westward of the "abstention line."

The Department has long planned such action and notice of such intention had been filed. Subsequently information from Alaska revealed a serious threat of early establishment of the highseas fishery which would jeopardize the Department's salmon conservation policy in the Bristol Bay area and further delay the salmon rehabilitation program which is so necessary to the welfare of Alaska.

Severe regulatory measures are in effect in Bristol Bay to arrest the decline and commence restoration of the runs that for years were three time their present size. These measures, among other things, restrict commercial fishing exclusively to gill nets, not more than 150 fathoms long, limit motorpropelled fishing boats to an over-all length of 32 feet, and limit the number of days fishing per week in accordance with the number of units of gear operating in each district.

With approximately half the number of units of gear operated in other recent years, and with only a four-week season, fishing is limited to two days per week in the Nushagak district, 21 days per week in the Egegik district, and three days per week in the Naknek-Kvichak and Ugashik districts. Further adjustments on fishing time are made weekly to meet changing conditions in the fishery and in the abundance of the

The final regulation was signed by Secretary of the Interior Fred A. Seaton on July 19 and appeared in the Federal Register of July 20, 1956, as follows:

TITLE 50-WILDLIFE

Chapter I-Fish and Wildlife Service, Department of the Interior

Subchapter F-Alaska Commercial Fisheries MISCELLANEOUS AMENDMENTS TO SUBCHAPTER

Basis and purpose. After consultation with the United States section of the International North Pacific Fisheries Commission, notice was published in the FEDERAL REGISTER on July 3, 1956 (21 F. R. 4932) of proposed rule making to prohibit salmon fishing, except trolling, by persons or vessls subject to the jurisdiction of the United States in certain waters adjacent to Alaska, and to redefine various fishing areas and districts. Subsequently, such fishing was prohibited in limited waters of Bering Sea by emergency regulation published in the FEDERAL REGISTER on July 7, 1956 (21 F. R. 5059), to avert the early establishment of a high seas fishery that would jeopardize the Bristol Bay salmon conservation program.

Accordingly, the following amend-ments and additions to 50 CFR Chapter I (Subchapter F, are effective immediately upon publication in the FEDERAL REGISTER, (60 Stat. 237; 5 U. S. C. 1001 et sea.)

PART 101-DEFINITIONS

A new section § 101.19 is added to read as follows:

§ 101.19 Waters of Alaska. As used in this subchapter, the term "waters of Alaska" includes those waters north and west of the International Boundary at Dixon Entrance extending three miles seaward (a) from the coast, (b) from lines extending from headland to headland across all bays, inlets, straits, passes, sounds and entrances, and (c) from any island or groups of islands, including the islands of the Alexander Archipelago, and the waters between such groups of islands and the mainland.

PART 103-KOTZEBUE-YUKON-KUSKOKWIM AREA

Section 103.1 is amended in text to read as follows:

§ 103.1 Definition. The Kotzebue-Yukon-Kuskokwim area includes all waters of Alaska between Point Hope and Cape Newenham.

PART 104-BRISTOL BAY AREA

Section 104.1 is amended in text to read as follows:

§ 104.1 Definition. The Bristol Bay area includes all waters of Alaska in Bristol Bay east of a line from Cape Newenham to a point 3 statute miles south of Cape Menshikof.

PART 105-ALASKA PENINSULA AREA Section 105.1 is amended in text to

read as follows: § 105.1 Definition. The Alaska Pen-insula area includes all waters of Alaska

from a point 3 statute miles south of Cape Menshikof to Unimak Pass, thence easterly to the western point at the entrance to Kuiukta Bay.

PART 106-ALEUTIAN ISLANDS AREA

Section 106.1 is amended in text to read as follows:

§ 106.1 Definition. The Aleutian Islands area includes all waters of Alaska in the Aleutian Islands west of, and including, Unimak Pass.

PART 109-COOK INLET AREA

Section 109.1 is amended in text to read as follows:

§ 109.1 Definition. The Cook Inlet area includes all waters of Alaska in Cook Inlet north of Cape Douglas and west of Point Gore, including the Barren Islands

PART 110-RESURRECTION BAY AREA

Section 110.1 is amended in text to read

§ 110.1 Definition. The Resurrection Bay area includes all waters of Alaska in the Gulf of Alaska between Point Gore and Cape Fairfield.

PART 115-SOUTHEASTERN ALASKA AREA SALMON FISHERIES, GENERAL REGULA-TIONS

PART 116-SOUTHEASTERN ALASKA AREA FISHERIES OTHER THAN SALMON

PART 117-SOUTHEASTERN ALASKA AREA,

ICY STRAIT DISTRICT, SALMON FISHERIES PART 118-SOUTHEASTERN ALASKA AREA, WESTERN DISTRICT, SALMON FISHERIES

PART 119-SOUTHEASTERN ALASKA AREA. EASTERN DISTRICT, SALMON FISHERIES

PART 120-SOUTHEASTERN ALASKA AREA. STIKINE DISTRICT, SALMON FISHERIES

PART 121-SOUTHEASTERN ALASKA AREA. SUMNER STRAIT DISTRICT, SALMON FISH-ERIES

PART 122-SOUTHEASTERN ALASKA AREA, CLARENCE STRAIT DISTRICT, SALMON FISHERIES

PART 123-SOUTHEASTERN ALASKA AREA, SOUTH PRINCE OF WALES DISTRICT, SALMON FISHERIES

PART 124 - SOUTHEASTERN ALASKA AREA, SOUTHERN DISTRICT, SALMON FISHERIES

1. Sections 115.1, 116.1, 117.1, 118.1, 119.1, 120.1, 121.1, 122.1, 123.1, and 124.1 are amended in text to read as follows:

The Southeastern Alaska area includes all waters of Alaska in Southeastern Alaska between Cape Fairweather and Dixon Entrance.

2. Sections 117.2, 118.2, 119.2, 121.2, 122.2, 123.2 and 124.2 are amended in text by deleting the words "territorial waters" and substituting in lieu thereof the words "waters of the area."

(Sec. 1, 43 Stat. 464, as amended, sec. 12, 68 Stat. 700; 48 U. S. C. 221, 16 U. S. C. 1031)

PART 130-NORTH PACIFIC AREA

The title to Part 130 is redesignated to read as set forth above and the revised part reads as follows:

130.1 Definition, North Pacific area

130.2 Salmon fishing prohibited, exception. AUTHORITY: §§ 130.1 and 130.2 issued under sec. 1, 43 Stat. 464, as amended, sec. 12, Stat. 700; 48 U. S. C. 221, 16 U. S. C. 1031.

§ 130.1 Definition, North Pacific area, The North Pacific area is defined to include all waters of the North Pacific Ocean and Bering Sea north of Dixon Entrance and east of 175 degrees west longitude, exclusive of the waters of Alaska as defined in Part 101 of this subchapter.

§ 130.2 Salmon fishing prohibited, exception. No person or fishing vessel subject to the jurisdiction of the United States shall fish for or take salmon, except by trolling, in the North Pacific area as defined in this part.

> FRED A. SEATON. Secretary of the Interior.

Salmon fishing except by trolling was first prohibited in limited waters of the Bering Sea by an emergency regulation published in the Federal Register of July 7, 1956, as follows:

TITLE 50-WILDLIFE

Chapter I-Fish and Wildlife Service, Department of the Interior

Subchapter F-Alaska Commercial Fisheries

PART 130-HIGH SEAS SALMON FISHERY

Basis and purpose. The red salmon runs of Bristol Bay, once the most important in the world, are seriously depleted. yielding only about one-third their former production. As a consequence, severe regulations have been imposed on the established fishery, greatly restricting the number of fishing boats and fishing time. These measures have been necessary to reserve a breeding population and prevent further depletion.

It has been determined that a fishery beyond the Territorial waters of Alaska and not subject to existing protective

regulations, would nullify such conservation measures and cause irreparable damage to the already depleted red salmon runs to Bristol Bay. It was learned on July 3 that such high seas fishing was planned by certain operators, although there has been adequate notice at public hearings, in trade journals, and press notices that such fishing would be prohibited, and it was generally accepted by all segments of the Alaska fishing industry.

The United States Section of the International North Pacific Fisheries Commission has recommended that fishing for salmon on the high seas off the Alaska coast, except by trolling, be prohibited. Furthermore, the Chairman of the U.S. Section, by telephone July 4, urged emergency action to provide this protection to the Bristol Bay runs now.

Since an emergency has arisen and immediate action is necessary, further notice and public procedure on these regulations are impracticable and they shall become effective immediately upon publication in the FEDERAL REGISTER (60 Stat. 237; 54 U. S. C. 1001 et seq.).

A new part, designated Part 130, is added to read as follows:

§ 130.1 Salmon fishing prohibited, exception. No person or fishing vessel subject to the jurisdiction of the United States shall fish for or take salmon, except by trolling, on the high seas north of the Alaska Peninsula east of 162 degrees west longitude, including Bristol

(Sec. 12, 68 Stat. 700; 16 U. S. C. 1031)

FRED A. SEATON. Secretary of the Interior. JULY 5, 1956.

Notice of proposed rule making was published in the July 3, 1956 Federal Register as follows:

Fish and Wildlife Service [50 CFR Parts 101, 103, 104, 105, 106, 109, 110, 115, 117, 130]

ALASKA COMMERCIAL FISHERIES NOTICE OF PROPOSED RULE MAKING

Pursuant to Section 4 of the Administrative Procedure Act of June 11, 1946 (5 U. S. C. 1003) notice is hereby given that the Secretary of the Interior, under the authority of the act of June 18, 1926 (44 Stat. 752; 48 U. S. C. 221 et seq.), as amended, and the act of August 12, 1954 (68 Stat. 698; 48 U. S. C. 1021 et seq.), on the basis of successful exploratory net fishing for salmon native to Alaska on the high seas of the North Pacific Ocean. and after consultation with the United States section of the International North Pacific Fisheries Commission, proposes

1. Add the following section to Part

§ 101.19 Waters of Alaska. For the purpose of this part, the term "waters of Alaska" north and west of the International Boundary at Dixon Entrance are defined as including those extending

three miles seaward (a) from the coast. (b) from lines extending from headland to headland across all bays, inlets, straits, passes, sounds and entrances, and (c) from any island or groups of islands, including the islands of the Alexander Archipelago, and the waters between such groups of islands and the mainland.

To amend § 103.1 so as to define the Kotzebue-Yukon-Kuskokwim area to include all waters of Alaska between Point Hope and Cape Newenham;

b. To amend § 104.1 so as to define the Bristol Bay area to include all waters of Alaska in Bristol Bay east of a line from Cape Newenham to a point 3 statute miles south of Cape Menshikof;

c. To amend § 105.1 so as to define the Alaska Peninsula area to include all waters of Alaska from a point 3 statute miles south of Cape Menshikof to Unimak Pass, thence easterly to the western point at the entrance to Kuiukta Bay;

d. To amend § 106.1 so as to define the Aleutian Islands area to include all waters of Alaska in the Aleutian Islands west of, and including, Unimak Pass;

e. To amend § 109.1 so as to define the Cook Inlet area to include all waters of Alaska in Cook Inlet north of Cape Doug-

las and west of Point Gore, including the Barren Islands;

f. To amend § 110.1 so as to define the Resurrection Bay area to include all waters of Alaska in the Gulf of Alaska between Point Gore and Cape Fairfield;

g. To amend §§ 115.1, 116.1, 117.1, 118.1, 119.1, 120.1, 121.1, 122.1, 123.1, and 124.1 so as to define the Southeastern Alaska area to include all waters of Alaska in Southeastern Alaska between Cape Fairweather and Dixon Entrance;

h. To amend §§ 117.2, 118.2, 119.2, 121.2, 122.2, 123.2, and 124.2 by deleting the words "territorial waters" and substituting in lieu thereof the words waters of the area."

3. To add a new part reading as follows:

PART 130-NORTH PACIFIC AREA

§ 130.1 Definition. The North Pacific Area is defined to include all waters of the North Pacific Ocean and Bering Sea north of Dixon Entrance and east of 175 degrees west longitude, exclusive of the waters of Alaska as defined in Part 101 of this subchapter.

§ 130.2 Salmon fishing prohibited, exception. No person or fishing vessel sub-

ject to the jurisdiction of the United States shall fish for or take salmon, except by trolling, in the North Pacific Area, as defined in this part.

Interested persons are invited to participate in the proposed rule making by submitting their views, data, or arguments in writing to the Director, Fish and Wildlife Service, Washington 25, D. C., within 15 days from the date of publication of this notice in the FEDERAL REGISTER.

WESLEY A. D'EWART, Assistant Secretary of the Interior.

* * * * *

WHALING REGULATIONS REVISED:

The whaling regulations as last amended have been edited to conform

TITLE 50-WILDLIFE

Chapter III—International Regulatory Agencies (Fishing and Whaling)

Subchapter B—International Whaling Commission

PART 351-WHALING

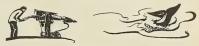
Basis and purpose. Section 13 of the Whaling Convention Act of 1949 (64 Stat. 421, 425; 16 U. S. C., 1952 ed., 916k), the legislation implementing the International Convention for the Regulation of Whaling signed at Washington December 2, 1946, by the United States of America and certain other Governments, provides that regulations of the International Whaling Commission shall be submitted for publication in the FEDERAL REGISTER by the Secretary of the Interior. Regulations of the Commission are defined to mean the whaling regulations in the schedule annexed to and constituting a part of the Convention in their original form or as modified, revised, or amended by the Commission. The provisions of the whaling regulations, as originally embodied in the schedule annexed to the Convention, have been amended several times by the International Whaling Commission, the last amendments having been made in July 1955. The whaling regulations, as last amended in July 1955, have been edited to conform the numbering, in-ternal references, and similar items to regulations of the Administrative Committee of the Federal Register but no changes have been made in the substantive provisions. The provisions of these regulations are applicable to nationals and whaling enterprises of the United States.

Amendments to the whaling regulations are adopted by the International Whaling Commission pursuant to Article, to the Convention without regard to the notice and public procedure requirements of the Administrative Procedure Act (5 U. S. C. 1001). Accordingly, in fulfillment of the duty imposed upon the Secretary of the Interior by section 13 of the Whaling Convention Act of 1949, the whaling regulations published as Part 351, Title 50, Code of Federal Regulations, as the same appeared in 20 F. R. 5231, July 21, 1955, are amended and republished to read as follows:

351.1

351.1 Inspection

Killing of gray or right whales prohibited. numbering, internal references, and similar items to regulations of the Ad-



ministrative Committee of the Federal Register, but no changes have been made in the substantive provisions. The provisions of these regulations are applicable to nationals and whaling enterprises of the United States. The regulations as they were published in the June 27 issue of the Federal Register follow

351.3 Killing of calves or suckling whales prohibited.

351.4 Operation of factory ships limited.
351.5 Closed area for factory ships in Antarctic.

351.6 Limitations on the taking of humpback whales.
351.7 Closed seasons for pelagic whaling

for baleen and sperm whales. 351.8 Catch quota for baleen whales.

351.9 Minimum size limits.
351.10 Closed seasons for land stations.

351.11 Use of factory ships in waters other than south of 40° South Latitude.
351.12 Limitations on processing of whales.

351.12 Elimitations on processing of whales. 351.13 Prompt processing required. 351.14 Remuneration of employees.

351.15 Submission of laws and regulations.
351.16 Submission of statistical data.
351.17 Factory ship operations within ter-

351.17 Factory ship operations within territorial waters. 351.18 Definitions.

AUTHORITY: §§ 351.1 to 351.18 issued under 64 Stat. 421-425; 16 U. S. C. 916-9161.

§ 351.1 Inspection. (a) There shall be maintained on each factory ship at least two inspectors of whaling for the purpose of maintaining twenty-four hour inspection. These inspectors shall be appointed and paid by the Government having jurisdiction over the factory ship.

(b) Adequate inspection shall be maintained at each land station. The inspectors serving at each land station shall be appointed and paid by the Government having jurisdiction over the land station.

§ 351.2 Killing of gray or right whales prohibited. It is forbidden to take or kill gray whales or right whales, except when the meat and products of such whales are to be used exclusively for local consumption by the aborigines.

§ 351.3 Killing of calves or suckling whales prohibited. It is forbidden to take or kill calves or suckling whales or female whales which are accompanied by calves or suckling whales.

§ 351.4 Operation of factory ships limited. (a) It is forbidden to kill or attempt to kill blue whales in the North Atlantic Ocean for a period of five years. (b) It is forbidden to use a whale catcher attached to a factory ship for the purpose of killing or attempting to kill baleen whales in any of the follow-

(1) In the waters north of 66° North Latitude except that from 150° East Longitude eastwards as far as 140° West Longitude the taking or killing of baleen whales by a factory ship or whale catcher

shall be permitted between 66° North Latitude and 72° North Latitude; (2) In the Atlantic Ocean and its de-

(2) In the Atlantic Ocean and its dependent waters north of 40° South Latitude:

(3) In the Pacific Ocean and its dependent waters east of 150° West Longitude between 40° South Latitude and 35° North Latitude;

35° NORTH LABRUNGS;
(4) In the Pacific Ocean and its dependent waters west of 150° West Longitude between 40° South Latitude and 20° North Latitude;

(5) In the Indian Ocean and its dependent waters north of 40° South Latitude.

§ 351.5 Closed area for Jactory ships in Antarctic. It is forbidden to use a whale eatcher attached to a factory ship for the purposes of killing or attempting to kill baleen whales in the waters south of 40° South Latitude from 70° West Longitude westward as far as 160° West Longitude. (This article, as the result of the seventh meeting at Moscow, was rendered inoperative for a period of three years from November 8, 1955, after which it will automatically become operative again (November 8, 1958.).)

§ 351.6 Limitations on the taking of humpback whales. (a) It is forbidden to kill or attempt to kill humpback whales in the North Atlantic Ocean for a period of five years.

(b) It is forbidden to kill or attempt to kill humpback whales in the waters south of 40° South Latitude between 0° Longitude and 70° West Longitude for a period of five years.

(c) It is forbidden to use a whate catcher attached to a factory ship for the purpose of killing or attempting to kill humpback whales in any waters south of 40° South Latitude except on the 1st, 2d, 3d, and 4th February in any year.

§ 351.7 Closed seasons for pelagic whaling for baleen and sperm whales, (a) It is forbidden to use a whale catcher attached to a factory ship for the purpose of killing or attempting to kill baleen whales (excluding minke whales)

¹This pargraph was objected to within the prescribed period ending November 7, 1954, by the Government of Iceland, and subsequently by that of Demmark. Neither objection was withdrawn and the paragraph came into force on February 24, 1956, but is not binding on Iceland and Demmark. It ceases to operate as from February 24, 1960, in any waters south of 40° South Latitude, except during the period from January 7 to April 7, following, both days inclusive; and no such whale catcher shall be used for the purpose of killing or attempting to kill blue whales before the 1st February in any year.

(b) It is forbidden to use a whale catcher attached to a factory ship for the purpose of killing or attempting to kill sperm or minke whales, except as permitted by the Contracting Governments in accordance with paragraphs (c), (d) and (e) of this section.

(c) Each Contracting Government shall declare for all factory ships and whale catchers attached thereto under its jurisdiction, one continuous open season not to exceed eight months out of any period of twelve months during which the taking or killing of sperm whales by whale catchers may be permitted; provided that a separate open season may be declared for each factory ship and the whale catchers attached thereto.

(d) Each Contracting Government shall declare for all factory ships and whale catchers attached thereto under its jurisdiction one continuous open season not to exceed six months out of any period of twelve months during which the taking or killing of minke whales by the whale catchers may be permitted; provided that:

(1) A separate open season may be declared for each factory ship and the whale catchers attached therefor

whale catchers attached thereto;
(2) The open season need not necessarily include the whole or any part of the period declared for other baleen whales pursuant to paragraph (a) of this section.

(e) Each Contracting Government shall declare for all whale catchers under its jurisdiction not operating in conjunction with a factory ship or land station one continuous open season not to exceed six months out of any period of twelve months during which the taking or killing of minke whales by such whale catchers may be permitted.

§ 351.8 Catch quota for baleen whales.
(a) The number of baleen whales taken
during the open season caught in any
waters south of 40° South Latitude by
whale catchers attached to factory ships
under the jurisdiction of the Contracting Governments shall not exceed fifteen
thousand blue-whale units in the season
1955-56 and fourteen thousand five hundred blue-whale units thereafter.

(b) For the purposes of paragraph (a) of this section, blue-whale units shall be calculated on the basis that one blue whale equals:

(1) Two fin whales or

(2) Two and a half humpback whales

(3) Six sel whales.
(c) Notification shall be given in accordance with the provision of Article VII of the Convention, within two days after the end of each calendar week, of

data on the number of blue-whale units

²The reduction for the season 1955-56 came into operation as from November 8, 1955, and the further reduction thereafter as from March 7, 1956, but the further reduction is not binding on the Governments of the Netherlands, the United Kingdom, Panama, South Africa, Noversy, Japan, U. S. A. and Canada, who lodged objections within the prescribed period.

taken in any waters south of 40° South. Latitude by all whale eatchers attached to factory ships under the jurisdiction of each Contracting Government: Provided, That when the number of blue-whale units is deemed by the Bureau of International Whaling Statistics to have reached 13,500 in the season 1955-56 and 13,000 thereafter." notification shall be given as aforesaid at the end of each day of data on the number of blue-whale

units taken. (d) If it appears that the maximum catch of whales permitted by paragraph (a) of this section may be reached before April 7 of any year, the Bureau of Inter-national Whaling Statistics shall determine, on the basis of the data provided, the date on which the maximum catch of whales shall be deemed to have been reached and shall notify the master of each factory ship and each Contracting Government of that date not less than four days in advance thereof. The killing or attempting to kill baleen whales by whale catchers attached to factory ships shall be illegal in any waters south of 40° South Latitude after midnight of the date so determined.

(e) Notification shall be given in accordance with the provisions of Article VII of the Convention of each factory ship intending to engage in whaling operations in any waters south of 40° South Latitude.

§ 351.9 Minimum size limits. (a) It is forbidden to take or kill any blue, sei or humpback whales below the following lengths:

Blue whales 70 feet (21.3 metres), Sei whales 40 feet (12.2 metres), Humpback whales 35 feet (10.7 metres),

except that blue whales of not less than 65 feet (19.8 metres) and sei whales of not less than 35 feet (10.7 metres) in length may be taken for delivery to land stations, provided that the meat of such whales is to be used for local consumption as human or animal food.

(b) It is forbidden to take or kill any fin whales below 57 feet (17.4 metres) in length for delivery to factory ships or land stations in the Southern Hemisphere, and it is forbidden to take or kill fin whales below 55 feet (16.8 metres) for delivery to factory ships or land stations in the Northern Hemisphere; except that fin whales of not less than 55 feet (16.8 metres) may be taken for delivery to land stations in the Southern Hemisphere and fin whales of not less than 50 feet (15.2 metres) may be taken for delivery to land stations in the Northern Hemisphere provided in each case that the meat of such whales is to be used for local consumption as human or animal food.

(c) It is forbidden to take or kill any sperm whales below 38 feet (11.6 metres) in length, except that sperm whales of not less than 35 feet (10.7 metres) in length may be taken for delivery to land stations.

(d) Whales must be measured when at rest on deck or platform, as accurately as possible by means of a steel tape measure fitted at the zero end with a spiked handle which can be stuck into the deck planking abreast of one end of the whale. The tape measure shall be stretched in a straight line parallel with the whale's body and read abreast the other end of the whale. The ends of the

whale, for measurement purposes, shall be the point of the upper jaw and the notch between the tail flukes. Measurements, after being accurately read on the tape measure, shall be logged to the nearest foot, that is to say, any whale between 75 feet 6 inches and 76 feet 6 inches shall be logged as 76 feet, and any whale between 76 feet 6 inches and 77 feet 6 inches shall be logged as 77 feet. The measurement of any whale which falls on an exact half foot shall be logged at the next half foot, e. g. 76 feet 6 inches precisely shall be logged as 77 feet.

§ 351.10 Closed seasons for land stations. (a) It is forbidden to use a whale catcher attached to a land station for the purpose of killing or attempting to kill baleen and sperm whales except as permitted by the Contracting Government in accordance with paragraphs (b), (c), and (d) of this section.

(b) Each Contracting Government shall declare for all land stations under its jurisdiction, and whale catchers attached to such land stations, one open season during which the taking or killing of baleen (excluding minke) whales by the whale catchers shall be permitted. Such open season shall be for a period of not more than six consecutive months in any period of twelve months and shall apply to all landstations under the jurisdiction of the Contracting Government; provided that a separate open season may be declared for any land station used for the taking or treating of baleen (excluding minke) whales which is more than 1,000 miles from the nearest land station used for the taking or treating of baleen (excluding minke) whales under the jurisdiction of the same Contracting Government.

(c) Each Contracting Government * shall declare for all land stations under its jurisdiction and for whale catchers attached to such land stations, one open season not to exceed eight continuous months in any one period of twelve months, during which the taking or killing of sperm whales by the whale catchers shall be permitted, such period of eight months to include the whole of the period of six months declared for baleen whales (excluding minke whales) as provided for in paragraph (b) of this section; provided that a separate open season may be declared for any land station used for the taking or treating of sperm whales which is more than 1,000 miles from the nearest land station used for the taking or treating of sperm whales under the jurisdiction of the same Contracting Government.

(d) (1) Each Contracting Government shall declare for all land stations under its jurisdiction and for whale catchers attached to such land stations one open season not to exceed six continuous months in any period of twelve months during which the taking or killing of minke whales by the whale catchers shall be permitted (such period not being necessarily concurrent with the period declared for other baleen whales, as provided for in paragraph (b) of this sec-

Section 35.10 (c) came into force as from February 21, 1982, in respect to all Contracting Governments, except the Commonwealth of Australia, who lodged an objection to it within the prescribed period, and this objection was not withdrawn. The provisions of this paragraph are not therefore binding on the Commonwealth of Australia. tion); provided that a separate open season may be declared for any land station used for the taking or treating of minke whales which is more than 1,000 miles from the nearest land station used for the taking or treating of minke whales under the jurisdiction of the same Contracting Government.

(2) Except that a separate open season may be declared for any land station used for the taking or treating of minke whales which is located in an area having oceanographic conditions clearly distinguishable from those of the area in which are located the other land stations used for the taking or treating of minke whales under the jurisdiction of the same Contracting Government; but the declaration of a separate open season by virtue of the provisions of this paragraph shall not cause thereby the period of time covering the open seasons declared by the same Contracting Government to exceed nine continuous months of any twelve months

(e) The prohibitions contained in this section shall apply to all land stations as defined in Article II of the Whaling Convention of 1946 and to all factory ships which are subject to the regulations governing the operation of land stations under the provisions of \$ 351.17.

§ 351.11 Use of factory ships in waters other than south of 40° South Latitude. It is forbidden to use a factory ship which has been used during a season in any waters south of 40° South Latitude for the purpose of treating baleen whales, in any other area for the same purpose within a period of one year from termination of that season.

§ 351.12 Limitations of processing of whales. (a) It is forbidden to use a factory ship or a land station for the purpose of treating any whales (whether or not killed by whale catchers under the jurisdiction of a Contracting Government) the killing of which by whale catchers under the jurisdiction of a Contracting Government is prohibited by the provisions of §§ 351.2, 351.4, 351.5, 351.6, 351.7. 351-8 or 351.10.

(b) All other whales (except minke

whales) taken shall be delivered to the factory ship or land station and all parts of such whales shall be processed by boiling or otherwise, except the internal organs, whale bone and flippers of all whales, the meat of sperm whales and of parts of whales intended for human food or feeding animals.

(c) Complete treatment of the carcasses of "Dauhval" and of whales used as fenders will not be required in cases where the meat or bone of such whales is in bad condition.

§ 351.13 Prompt processing required.

(a) The taking of whales for delivery to a factory ship shall be so regulated or restricted by the master or person in charge of the factory ship that no whale carcass (except of a whale used as a fender, which shall be processed as soon as is reasonably practicable) shall remain in the sea for a longer period than thirty-three hours from the time of killing to the time when it is hauled up for treatment.

(b) Whales taken by all whale catchers, whether for factory ships or land stations, shall be clearly marked so as to identify the catcher and to indicate the order of catching.

(c) All whale catchers operating in conjunction with a factory ship shall report by radio to the factory ship:

(1) The time when each whale is taken,

(2) Its species, and (3) Its marking effected pursuant to paragraph (b) of this section.

(d) The information reported by radio pursuant to paragraph. (c) of this section shall be entered immediately in a permanent record which shall be available at all times for examination by the whaling inspectors; and in addition there shall be entered in such permanent record the following information as soon as it becomes available:

(1) Time of hauling up for treatment, (2) Length, measured pursuant to paragraph (d) of § 351.9,

(3) Sex.

(4) If female, whether milk-filled or lactating. (5) Length and sex of foetus, if pres-

ent and

(6) A full explanation of each infraction.

(e) A record similar to that described in paragraph (d) of this section shall be maintained by land stations, and all of the information mentioned in the said paragraph shall be entered therein as soon as available.

§ 351.14 Remuneration of employees. Gunners and crews of factory ships, land stations, and whale catchers, shall be engaged on such terms that their remuneration shall depend to a considerable extent upon such factors as the species, size and yield of whales taken and not merely upon the number of the whales taken. No bonus or other remuneration shall be paid to the gunners or crews of whale catchers in respect to the taking of milk-filled or lactating whales.

§ 351.15 Submission of laws and regulations. Copies of all official laws and regulations relating to whales and whaling and changes in such laws and regulations shall be transmitted to the Com-

§ 351.16 Submission of statistical data. Notification shall be given in accordance with the provisions of Article VII of the Convention with regard to all factory ships and land stations of statistical information (a) concerning the number of whales of each species taken, the number thereof lost, and the number treated at each factory ship or land station, and (b) as to the aggregate amounts of oil of each grade and quantities of meals fertilizer (guano), and other products derived from them, together with (c) particulars with respect to each whale treated in the factory ship or land station as to the date and approximate latitude and longitude of taking, the species and sex of the whale, its length and, if it contains a foetus, the length and sex, if ascertainable, of the foetus. The data referred to in paragraphs (a) and (c) of this section shall be verified at the time of the tally and there shall also be notification to the Commission of any information which may be collected or obtained concerning the calving grounds and migration routes of whales. In communicating this in-

formation there shall be specified: (a) The name and gross tonnage of each factory ship;

(b) The number and aggregate gross tonnage of the whale catchers;

(c) A list of the land stations which were in operation during the period concerned.

8 351.17 Factory ship operations within territorial waters. (a) A factory ship which operates solely within territorial waters in one of the areas specifled in paragraph (c) of this section, by permission of the Government having jurisdiction over those waters, and which flies the flag of that Government shall, while so operating, be subject to the regulations governing the operation of land stations and not to the regulations governing the operation of factory ships.

(b) Such factory ship shall not, within a period of one year from the termination of the season in which she so operated, be used for the purpose of treating baleen whales in any of the other areas specified in paragraph (c) of this section or south of 40° South Latitude.
(c) The areas refered to in paragraphs

(a) and (b) of this section are:

(1) On the coast of Madagascar and its dependencies:

(2) On the west coasts of French Africa .

(3) On the coasts of Australia, namely on the whole east coast and on the west coast in the area known as Shark Bay and northward to North-west Cape and including Exmouth Gulf and King George's Sound, including the Port of Albany.

§ 351.18 Definitions. The following expressions have the meanings respectively assigned to them, that is to say:

"Baleen whale" means any whale which has baleen or whale bone in the mouth, i. e., any whale other than a toothed whale. "Blue whale" (Balaenoptera or Sib-

baldus musculus) means any whale known by the name of blue whale, Sibbald's rorqual, or sulphur bottom.

"Dauhval" means any unclaimed dead whale found floating.

"Fin whale" (Balaenoptera physalus) means any whale known by the name of common finback, common rorqual, finback, finner, fin whale, herring whale, razorback or true fin whale.

"Gray whale" (Rhachianectes glaucus) means any whale known by the name of gray whale, California gray, devil fish, hard head, mussel digger, gray back or rip sack.

"Humpback whale" (Megaptera nodosa or novaeangliae) means any whale known by the name of bunch, humpback,

4 Section 351.17 was inserted by the Commission at its first meeting in 1949, and came into force on 11th January, 1950, as regards all Contracting Governments except France, who therefore remain bound by the provi-sions of the original § 351.17, which reads as

§ 351.17 Notwithstanding the definition of land station contained in Article II of the Convention, a factory ship operating under the jurisdiction of a Contracting Govunder the jurisdiction of a constant of which are ernment, and the movements of which are confined solely to the territorial waters of that Government, shall be subject to the regulations governing the operation of land stations within the following areas:

. (a) On the coast of Madagascar and its dependencies, and on the west coasts of French Africa:

(b) On the west coast of Australia in the area known as Shark Bay and northward to Northwest Cape and including Exmouth Gulf and King George's Sound, including the port of Albany; and on the east coast of Australia, in Twofold Bay and Jervis Bay.

humpback whale, humpbacked whale,

hump whale or hunchbacked whale.
"Minke whale" (Balaenoptera acutorostrata, B. Davidsoni, B. huttoni) means any whale known by the name of lesser rorqual, little piked whale, minke whale, pike-headed whale or sharp headed

"Right whale" (Balaena mysticetus; Eubalaena glacialis, E. australis, etc; Neobalaena marginata) means any whale known by the name of Atlantic right whale, Artic right whale, Biscayan

right whale, bowhead, great polar whale, Greenland right whale, Greenland whale, Nordkaper, North Atlantic right whale, North Cape whale, Pacific right whale, pigmy right whale, Southern pigmy right whale, or Southern right whale.

whate, or Southern right whate,
"Sei whate" (Baleanoptera borealis)
means any whate known by the name of
sei whate, Rudolphi's rorquat, pollack
whate, or coalfish whate and shall be
taken to include Bryde's whate (B,
brydei).

"Sperm whale" (Physeter catodon) means any whale known by the name of sperm whale, spermacet whale, cachalot or pot whale.

lot or pot whale.
"Toothed whale" means any whale which has teeth in the jaws.

"Whales taken" means whales that have been killed and either flagged or made fast to catchers,

FRED A. SEATON,
Secretary of the Interior,
June 20, 1956.



Eighty-Fourth Congress (Second Session)

Listed below and on the following pages are public bills and resolutions that direct-



ly or indirectly affect the fisheries and allied industries. Public bills and resolutions are shown when introduced; from month to month the more pertinent reports, hearings, or

chamber actions on the bills shown are published; and if passed, they are shown when signed by the President.

COMMERCIAL FISHERIES EDUCATIONAL PROGRAM: H. R. 10433 (McCormack), a bill to promote the fishing industry in the United States and its Territories by providing for the training of needed personnel for such industry, removed from the consent calendar of the House on July 16, 1956, Taib bill is similar to S. 2379 (Payne). House on July 21, 1956, adopted H, Res. $\underline{612}$, the rule providing for the consideration of, and one hour of debate on, H. R. 10433, but did not consider the bill,

House after it amended S. 2379 to contain the text of H. R. 10433, a similar bill passed S. 2379.

Senate on July 27 cleared for the President S. 2379 when it concurred in House amendments to the $\overline{\text{bill}}$.

 \underline{S} , 2379 signed by the President on August 8, 1956 $(\underline{P}, \underline{L}, \underline{1027})$,

a CUSTOMS SIMPLIFICATION ACT: H. R. 6040 (amended), a Tailf Act of 1930 and to repeal obsolete provisions of the trust of 1930 and to repeal obsolete provisions of the customs laws, reported favorably on July 9, 1956, by the Senate Committee on Finance, (This bill was introduced in the first session of the 84th Congress and was reported favorably to the House on June 18, 1955, H. Rept. 858.) Reported with amendments to the Senate by the Committee on Finance on July 13 (S. Rept. No. 2560).

Conferees agreed to file a report (July 21, 1956) on the differences between the Senate- and House-passed versions.

Senate adopted the conference report on July 25, 1956, and and cleared the bill for the President.

Senate Report No. 2560, Customs Simplification Act of 1956 (July 13, 1956, 94th Congress, 2nd Session), to accompany H. R. 6040, 28 pp., printed, Committee on Finance, Describes the amendments; purpose of the bill; general statement; changes in existing law; and presents minority views,

FISH AND WILDLIFE ACT OF 1956 (Previously referred to as "Commercial Fisheries National Policy and Undersecretary for Fisheries and Wildlife"; "Commercial Fisheries National Policy and Assistant Secretary for Fisheries and Wildlife"; also "Commercial Fisheries National Policy and Fisheries Commission"; and by other titles):

On July 7 after adopting an amendment that replaced the Senate-passed text with the provisions of \mathbf{H}_{\cdot} R, \mathbf{H}_{\cdot} 11570 (Bonner), the House passed on that date \mathbf{S}_{\cdot} 3275, a \mathbf{b} \mathbf{H}_{\cdot} \mathbf{B} \mathbf{b} \mathbf{H}_{\cdot} \mathbf{B} \mathbf{b} \mathbf{H}_{\cdot} \mathbf{B} \mathbf{H}_{\cdot} \mathbf{B} \mathbf{H}_{\cdot} \mathbf{B} \mathbf{H}_{\cdot} \mathbf{B} \mathbf{H}_{\cdot} \mathbf{B} \mathbf{H}_{\cdot} \mathbf{H}

Senate disagreed to House amendments to \$, 3275, to establish a sound and comprehensive national policy with regard to fisheries resources and asked for a conference with the House, and appointed conferees. \$, 3275 contains the text of H, R, 11570 (Bonner) which passed the House on July 7.

House and Senate conferees met in executive session to resolve differences between the Senate- and House-passed versions of S. 3275.

On July 26 conferees in executive session agreed to file a conference report on the differences between the Senateand House-passed versions of S, 3275.

Conference report on S. 3275 (H. Rept. 2942) was reported to the House on July 26. House on that date adopted the conference report on S. 3275 and sent the bill to the Senate.

Following the adoption by the House of the conference report on S, 3275, the Senate passed the bill on July 27, 1956, and the bill was cleared for the President. The bill as finally passed provides, among other provisions, for the following:

Sec. 3. (a) There is hereby established within the Department of the Interior the position of Assistant Secretary

for Fish and Wildlife, and the position of Commissioner of Fish and Wildlife. Such Assistant Secretary shall be appointed by the President, by and with the advice and consent of the Senate, and shall be compensated at the same rate as other Assistant Secretaries. The Commissioner shall be appointed by the President by and with the advice and consent of the Senate. He shall receive compensation at the same rate as that provided for Grade GS-18. There is also established a United States Fish and Wildlife Service within the Department, consisting of two separate agencies, each of which shall have the status of a Federal bureau. There shall be a Director of each of said Bureaus appointed by the Secretary at Grades GS-17 each. One of the agencies shall be known as the "Bureau of Commercial Fisheries" and the other agency shall be known as the "Bureau of Sport Fisheries and Wildlife." The United States Fish and Wildlife Service, except as prescribed by this Act, shall succeed to and replace the presently existing Fish and Wildlife Service of the Department. ...

- (d) In order to make a proper distribution between the two Bureaus of the UnitedStates Fish and Wildlife Service established by this Act, the previously existing functions, powers, duties, authority, liabilities, commitments, personnel, records, and other properties or matters previously handled by or administered through the former Fish and Wildlife Service of the Department, shall be distributed as follows:
- (1) The Bureau of Commercial Fisheries shall be responsible for those matters to which this Act applies relating primarily to commercial fisheries, whales, seals, sea-lipons, and related matters;
- (2) The Bureau of Sport Fisheries and Wildlife shall be responsible for those matters to which this Act applies relating primarily to migratory birds, game management, wildlife, refuges, sport fisheries, sea mammals (except whales, seals, and sea-lions), and related matters; and the funds and allocations, appropriated or otherwise, relating to the matters covered by paragraphs (1) and (2) of this subsection shall be distributed between such Bureaus as the Secretary of the Interior shall determine. ...
- Sec. 4. (a) The Secretary is authorized under rules and regulations and under terms and conditions prescribed by him, to make loans for financing and refinancing of operations, maintenance, replacement, repair, and equipment of fishing gear and vessels, and for research into the basic problems of fisheries.
- (b) Any loans made under the provisions of this section shall be subject to the following restrictions:
- (1) Bear an interest rate of not less than 3 per centum per annum; $\,$
 - (2) Mature in not more than ten years;
- (3) No financial assistance shall be extended pursuant to this section unless reasonable financial assistance applied for is not otherwise available on reasonable terms.
- (c) There is hereby created a fisheries loan fund, which shall be used by the Secretary as a revolving fund to make loans for financing and refinancing under this section. Any funds received by the Secretary on or before June 30, 1965, in payment of principal or interest on any loans so made, shall be deposited in the fund and be available for making additional loans under this section. Any funds so received after June 30, 1965, and any balance remaining in the fund at the close of June 30, 1965 (at which time the fund shall

- cease to exist), shall be covered into the Treasury as miscellaneous receipts. There are hereby authorized to be appropriated to the fund the sum of \$10,000,000 to provide initial capital.
- (d) The Secretary, subject to the specific limitations in this aection, may consent to the modification, with respect to the rate of interest, time of payment of any installment of principal, or security, of any loan contract to which he is a party.
- S. 3275 was signed by the President on August 8, 1956 (P. L. 1024).

House Report No. 2942, Fish and Wildlife Act of 1956 (July 26, 1956, 84th Congress, 2nd Session), conference report to accompany S. 3275, 9 pp., printed. Committee of Conference. Shows the agreed version of the bill and the statement of the managers on the part of the House.

FISH HATCHERIES: Senate on July 2 passed without amendment and cleared for the House 5, 3998, providing for the development of Federal fish hatchery known as Holden Trout Hatchery at Pittsford, Vt. Reported favorably on July 13 to the House by the House Committee on Merchant Marine and Fisheries. Passed by House on July 23 and cleared for the President.

- H. R. 11548 (Poff), a bill to establish a new fish hatchery in the vicinity of Paint Bank, Va., reported favorably to the House by the Committee on Merchant Marine and Fisheries, July 13. Passed the House without amendment on July 23. Reported to the Senate on July 25 by the Committee on Interstate and Foreign Commerce (S. Rept. 2806). Senate passed without amendment and cleared for the President H. R. 11548.
- H. R. 12303 (Staggers), introduced in the House July 11, a bill to provide for the establishment of a fish hatchery in West Virginia; to the Committee on Merchant Marine and Fisheries, Reported without amendment on July 21, 1956, by the Committee on Merchant Marine and Fisheries (H. Rept. 2858). House on July 26 passed and cleared for the President S. 3831 (in lieu of H. R. 12303), to provide for the establishment of a fish hatchery in West Virginia.
- H. R. 221, a bill to establish rearing ponds and a fish hatchery in western Oklahoma; passed over without prejudice by the House on July 16, 1956,

House Report No. 2269, Establishing Rearing Ponds and a Fish Hatchery in Western Oklahoma, Texas, Colorado, or Kansas (Tune 7, 1956, 84th Congress, 2nd Session), to accompany H. R. 221; 3 pp., printed. Lists amendments, discusses purpose, and presents reports of the Department of the Interior and the Bureau of the Budget,

S. 3809 (Carlson), a bill to provide for the establishment of a new fish hatchery at Cedar Bluff Reservoir; Senate reported on July 20, 1956, with an amendment by the Committee on Interstate and Foreign Commerce (S. Rept. 2672). Similar to H. R. 11012 (Smith of Kansas). Passed the Senate on July 23 with an amendment and cleared for the House.

NSECTICIDES EFFECT UPON FISH AND WILDLIFE: 5. 4478 (Murray) introduced in the Senate July 8; a bill to authorize and direct the Secretary of the Interior to undertake continuing studies of the effects of insecticides, herbicides, and fungicides upon fish and wildlife for the purpose of preventing losses of those invaluable natural resources

following spraying, and to provide basic data on the various chemical controls so that forests, croplands, and marshes can be sprayed with minimum losses of fish and wildlife; to the Committee on Merchant Marine Fisheries.

SPONGE DIVERS: H. R. 12022 (Cramer) introduced in the House June 28, 1956; a bill to provide relief for the sponge-fishing industry by a making special non quota immigrant visas available to certain skilled alien sponge divers; to the Committee on the Judiciary,

SUPPLEMENTARY APPROPRIATIONS; H. R. 12138, a bill making supplemental appropriations for fiscal year 1957; Senate adopted conference report on July 25 and cleared the bill for the President, This bill provides \$620,000 for the Great Lakes Fisheries Commission,

H. R. 12350, a bill making supplemental appropriations for the fiscal year 1957, reached the Senate floor on July 25; certain Committee amendments were adopted en bloc, and the bill was passed. The bill provides for supplemental appropriations for the U. S. Fish and Wildlife Service including an additional amount of \$1,250,000 for construction to be available until expended, and initial capital of \$10,000,000 for the "Fisheries Loan Fund," a revolving fund for financing and refinancing of operations, maintenance, replacement, repair, and equipment of fishing gear and vessels and for research into the basic problems of fisheries. Conferees on July 26 agreed to file a conference report on the differences between the Senate- and House-passed versions of H. R. 12350. Senate on July 26 rejected conference report on H. R. 12350. Senate then further insisted on its amendments in disagreement, asked for an additional conference, and reappointed the same conferees. Conference report on H. R. 12350 (H. Rept. 2941) was reported to the House on July 26. House on July 26 disagreed to Senate amendments to H. R. 12350; agreed to a conference with the Senate; and appointed conferees. On the same date House adopted the conference report on H. R. 12350, and sent the bill to the Senate. House on July 27 adopted H. Res. 648, providing for further insistence of House disagreement to Senate amendments to H. R. 12350; agreed to a further conference with the Senate, and the appointment of conferees. House conferees reported to House on July 27 conference report on H. R. 12350 (H. Rept. 2950). Adopted conference report and sent bill to Senate. Senate adopted conference report on H. R. 12350, agreeing to House amendments to amend certain Senate amendments and cleared the bill for the Presi-

Senate Report No. 2770, Second Supplemental Appropriation Bill, 1957 (July 24, 1956, 84th Congress, 2nd Session) to accompany H. R. 12350, 35 pp., printed, Committee on appropriations, Contains details on the appropriations and a comparative statement of budget estimates and amounts recommended in the bill,

House Report No. 2941, Second Supplemental Appropriation Bill, 1957 (July 26, 1956, 84th Congress, 2nd Session) to accompany H. R. 12359, 8 pp., printed, Committee of Conference, Describes agreement and presents the statement of the managers on the part of the House,

TRUCK TRIP LEASING: House on July 13 adopted committee amendments, passed, and returned to the Senate S. 898, to amend the Interstate Commerce Act with respect to the authority of the Interstate Commerce Commission to regulate the use by motor carriers of motor vehicles not owned by them.

Senate adopted conference report on July 25, 1956, and cleared the bill for the President.

The passage of this bill prohibits the LC.C. from restricting the use of exempt trucks. The bill fully protests the exempt truckers. The effect of the bill is to permit; (1) exempt truckers to "trip lease" their trucks to common carriers for payloads back to fish producing areas of their base of operations; and (2) private carriers (shippers) to "trip lease" their trucks which are used to haul perishable manufactured fishery, agricultural, or livestock products,

WATER POLLUTION; S. 890, a bill to extend and strengthen the Water Pollution Control Act. House adopted conference report and cleared the bill for the White House on June 27, 1956, Signed by the President on July 9, 1956 (P. L. 667).

The water pollution control law extension bill provides for the Federal Government to subsidize the building of state or municipal treatment facilities. Present law authorizes loans up to \$22,5 million a year but no funds have ever been dispensed under the provision. The new bill makes \$50 million available a year over a ten year period in grants for construction of local facilities, Another \$3 million a year in grants may be made for pollution-control planning and program work,

PACIFIC COAST AND ALASKA FISHERIES, Senate Report No. 2801 (Report of the Committee on Interstate and Foreign Commerce pursuant to S. Res. 13 and S. Res. 163, 84th Congress, 2nd Session, providing for the investigation of certain problems within the jurisdiction of the Senate Committee on Interstate and Foreign Commerce), submitted to the Senate July 25, 40 pp., printed. This report of conditions affecting commercial fisheries on the Pacific Coast and Alaska discusses Alaska salmon and related fisheries. the tuna fishing industry, and secondary effects of the fishing industry depression. Included are conclusions and recommendations regarding the creation of a new Government authority; conservation and development; regulation of competitive imports; and economic aid. An addendum lists recent fisheries legislation and appendixes show the correspondence between the Committee Chairman and the Department of State and the U.S. Tariff Commission.

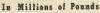
INTERIOR DEPARTMENT AND RELATED AGENCIES APPROPRIATIONS FOR 1957 (Hearings before the Subcommittee of the Committee on Appropriations House of Representatives, Eighty-Fourth Congress, Second Session), 1,002 pp., printed,

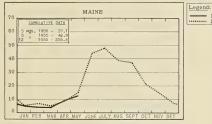
Both the House and Senate adjourned sine die on July 27, 1956.

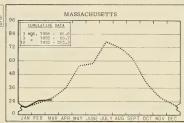


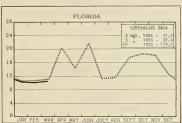


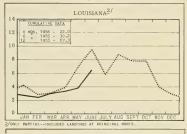
CHART I - FISHERY LANDINGS for SELECTED STATES

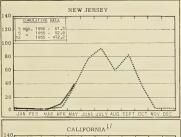


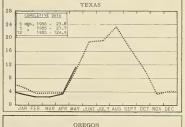












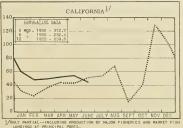
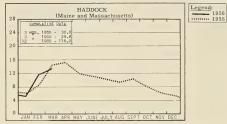




CHART 2 - LANDINGS for SELECTED FISHERIES

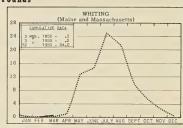
In Millions of Pounds



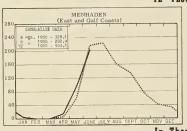


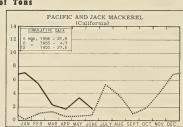
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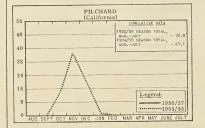


In Thousands of Tons





In Thousands of Tons



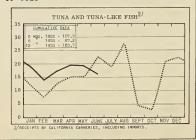
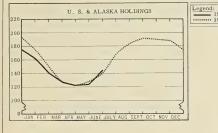
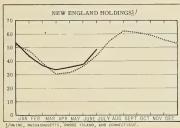


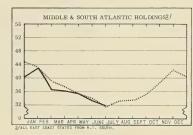
CHART 3 - COLD-STORAGE HOLDINGS and FREEZINGS of FISHERY PRODUCTS *

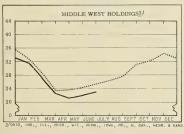
In Millions of Pounds

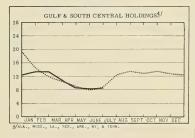


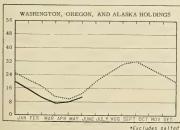












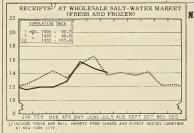


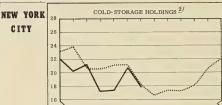
*Excludes salted, cured, and smoked products.

CHART 4 - RECEIPTS and COLD-STORAGE HOLDINGS of FISHERY PRODUCTS at PRINCIPAL DISTRIBUTION CENTERS



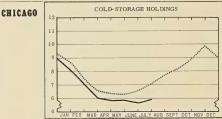
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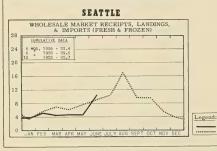




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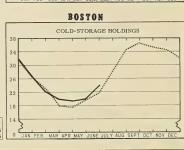
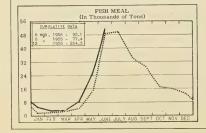


CHART 5 - FISH MEAL and OIL PRODUCTION - U.S and ALASKA



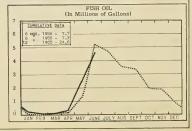
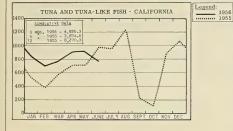
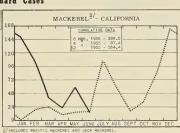
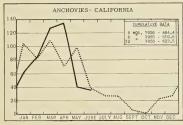


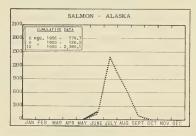
CHART 6 - CANNED PACKS of SELECTED FISHERY PRODUCTS

In Thousands of Standard Cases



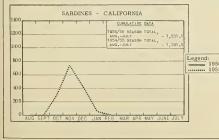






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STANDARD CASES										
Variety	No. Cans	Can Designation	Net Wgt.							
SARDINES	100	1/4 drawn	$3\frac{1}{4}$ oz.							
SHRIMP	48		5 oz.							
TUNA	48	No. ½ tuna	6 & 7 oz.							
PILCHARDS	48	No, 1 oval	15 oz.							
SALMON	48	1-pound tall	16 oz,							
ANCHOVIES	48	½ lb.	8 oz.							



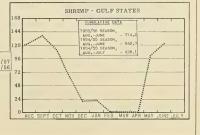
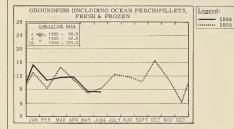
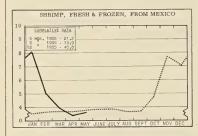


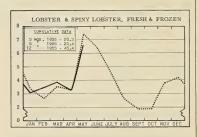
CHART 7 - U.S. FISHERY PRODUCTS IMPORTS

In Millions of Pounds

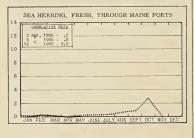


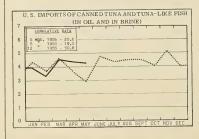


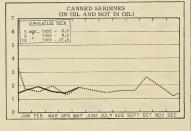














FISH AND WILDLIFE SERVICE **PUBLICATIONS**

THESE PROCESSED PUBLICATIONS ARE AVAILABLE FREE FROM THE DIVISION OF INFORMATION, U. S. FISH AND WILDLIFE SERV-ICE, WASHINGTON 25, D. C. TYPES OF PUBLICATIONS ARE DESIGNATED AS FOLLOWS:

- CURRENT FISHERY STATISTICS OF THE UNITED STATES

AND ALASKA,

- MARKET DEVELOPMENT LISTS,

- STATISTICAL SECTION LISTS OF DEALERS IN AND PRODUCERS OF FISHERY PRODUCTS AND BYPRODUCTS,

DUCERS OF FISHERY PRODUCTS AND BYPHODUCTS,
FL - FISHERY LEAFLETS,
SSR. - FISH, - SPECIAL SCIENTIFIC REPORTS--FISHERIES
(LIMITED DISTRIBUTION),
SEP. - SEPARATES (REPRINTS) FROM COMMERCIAL FISHERIES

REVIEW.

Number Title

CFS-1281 - New York Landings, 1955 Annual Summary, 9 pp.

CFS-1298 - Maine Landings, 1955 Annual Summary (by County and Gear), 10 pp. CFS-1309 - Maine Landings, 1955 Annual Summary

(by Months), 10 pp. CFS-1312 - Massachusetts Landings, 1955 Annual

Summary (by Ports), 16 pp. CFS-1313 - Alaska Fisheries, 1955 Annual Sum-

mary, 6 pp. CFS-1314 - Fish Meal & Oil, Mar. 1956, 2 pp. CFS-1316 - Rhode Island Landings, 1955 Annual

Summary, 6 pp. CFS-1318 - New York Landings, Feb. 1956, 4 pp. CFS-1323 - California Landings, Jan. 1956, 4 pp.

CFS-1324 - Florida Landings, Jan. 1956, 6 pp. CFS-1325 - New Jersey Landings, Mar. 1956, 3 pp.

CFS-1326 - North Carolina Landings, Mar. 1956, 2 pp.

CFS-1327 - Georgia Landings, Mar. 1956, 2 pp CFS-1328 - Frozen Fish Report, April 1956, 8 pp. CFS-1329 - Texas Landings, Mar. 1956, 3 pp.

CFS-1330 - New York Landings, Mar. 1956, 4 pp. CFS-1331 - Florida Landings, 1955 Annual Sum-

mary, 10 pp. CFS-1333 - Rhode Island Landings, Mar. 1956, 3 pp.

CFS-1335 - Middle Atlantic Fisheries, 1954 Annual Summary, 5 pp.

CFS-1336 - Florida Landings, Feb. 1956, 6 pp. CFS-1338 - Fish Meal & Oil, 1955 Annual Summary, 4 pp.

CFS-1341 - California Landings, Feb. 1956, 4 pp. CFS-1342 - Alabama Landings, Mar. 1956, 2 pp. CFS-1343 - Ohio Landings, April 1956, 2 pp.

CFS-1344 - New England Fisheries, 1954 Annual Summary, 7 pp. CFS-1345 - Fish Meal & Oil, April 1956, 2 pp.

CFS-1346 - Texas Landings, April 1956, 4 pp. CFS-1347 - New Jersey Landings, Apr. 1956, 4 pp. CFS-1348 - Georgia Landings, April 1956, 2 pp.

CFS-1351 - North Carolina Landings, Apr. 1956 3 pp.

CFS-1352 - New York Landings, April 1956, 4 pp.

CFS-1353 - Rhode Island Landings, Apr. 1956, 3 pp.

CFS-1354 - Maine Landings, April 1956, 3 pp. CFS-1355 - Mississippi Landings, Apr. 1956, 2 pp.

CFS-1356 - Alabama Landings, Apr. 1956, 2 pp.

MDL- 2 - Michigan Locker Plants, Apr. 1956, 8 pp. MDL- 3 - Tennessee Locker Plants, May 1956, 4 pp.

MDL- 8 - Montana Locker Plants, Apr. 1956, 7 pp. MDL- 9 - Oklahoma Locker Plants, May 1956, 8 pp.

MDL-12 - Texas Locker Plants, May 1956, 17 pp. MDL-13 - New York Locker Plants, May 1956, 7 pp.

MDL-16 - N. Dak. Locker Plants, May 1956, 7 pp. MDL-19 - Washington Locker Plants, May 1956, 14 pp.

MDL-21 - New Jersey Locker Plants, May 1956, 3 pp. MDL-23 - Rhode Island Locker Plants, May 1956, 1 p.

MDL-24 - Ohio Locker Plants, May 1956, 11 pp. MDL-26 - Colorado Locker Plants, May 1956, 6 pp.

MDL-28 - Vermont Locker Plants, May 1956, 2 pp.

MDL-29 - Virginia Locker Plants, 4 pp. MDL-30 - North Carolina Locker Plants, May 1956, 5 pp.

MDL-31 - Oregon Locker Plants, May 1956, 11 pp. MDL-34 - Missouri Locker Plants, May 1956, 15 pp.

MDL-43 - South Carolina Locker Plants, May 1956 3 pp.

MDL-44 - South Dakota Locker Plants, May 1956, 8 pp.

MDL-45 - Utah Locker Plants, May 1956, 4 pp. MDL-46 - West Virginia Locker Plants, May 1956, 2 pp.

SL - 6 - Wholesale Dealers in Fishery Products, New York Coastal Area, 1955, 6 pp.

FL-426 - Household Consumer Preferences for Breaded Shrimp & Breaded Fish Sticks. Part 3 -- Summary by Income Groups, Household Size, Homemaker Age Groups, and Occupation, 155 pp., illus., proc-

essed, Feb. 1956. FL-429 - Factors to be Considered in the Freezing and Cold Storage of Fishery Products, 66 pp. (Part 3).

FL-430 - Refrigeration of Fish, 125 pp. (Part 4).

SSR-Fish. No. 164 - Mid-Pacific Oceanography, Part VII, Hawaiian Offshore Waters, September 1952-August 1953, by Gunter R. Seckel, 257 pp., illus., processed, November 1955.

SSR-Fish. No. 170 - Use of Infrared Radiation in the Study of Fish Behavior, by Rea E. Duncan, 20 pp., illus., processed, March 1956.

SSR-Fish. No. 171 - January to April Distribution of the Common Shrimp on the South Atlantic Continental Shelf, by William W. Anderson, 17 pp., illus., processed, April 1956.

SSR-Fish. No. 172 - Effect of Sound Waves on Young Salmon, by Harvey L. Moore and

H. William Newman, 22 pp., illus., processed, April 1956.

Sep. No. 441 - Composition of Southern Oysters.
Sep. No. 442 - Exploratory Fishing Vessel George
M. Bowers: Part I - Description of Vessel,
Part II - Vessel's Electrical and AuxiliaryDrive Systems.

Sep. No. 443 - Research in Service Laboratories (July 1956): Contains these short articles-"Storage Tests on Frozen Fried Fish Sticks Prepared from Pacific Cod," "Effect of Raw Material on Tuna-Meal Quality," "Research Programs Discussed at Pacific Fisheries Technologists Conference," "Progress in Research on Southern Oysters," "New Techniques for Freezing and Storing North Atlantic Lobsters."

THE FOLLOWING SERVICE PUBLICATIONS ARE FOR SALE AND ARE AVAILABLE ONLY FROM THE SUPERINTENDENT OF DOCUMENTS, WASHINGTON 25, D. C.

Fishery Statistics of the United States 1953, by
A. W. Anderson and E. A. Power, Statistical Digest No. 36, 340 pp., illus., printed, \$1.50, 1956. This is the latest in a series of annual statistical reports on the fisheries of the United States, Alaska, and Hawaii, which contains data on the catch and ex-vessel value of fishery products, employment in the fisheries, quantity of gear operated, the number of fishing craft employed in the capture of fishery products, and certain information on the production and value of manufactured fishery products and byproducts. The statistical surveys conducted during 1954 for 1953 data were conducted in all sections of the United States except in the Mississippi River States which were last canvassed in 1950. The total catch of fishery products to taled 4,467,960,000 pounds, valued at \$352,275,000 ex-vessel--an increase of 1 percent in quantity as compared with 1952. Had there not been a spectacular gain in the production of menhaden during the year, the catch would have been far below that of 1952. Menhaden production off the Atlantic and Gulf States during 1953 again broke all records with the catch of this item soaring to nearly 1.7 billion pounds. This was a gain of over 312 million pounds above the production of the previous year and the largest catch of this species in history. Shrimp was again the most valuable single item taken by domestic fishermen. The catch of these shell-fish totaled a record 260 million pounds valued at nearly \$77 million ex-vessel, the highest annual value ever recorded in a United States fishery. Major fisheries recording noticeable production decreases during 1953 were ocean perch, salmon, tuna, sea herring, Pacific sardines, mackerel, and oysters. Price disputes in several of the more productive New England ports contributed greatly to the marked decline in the ocean perch fishery. The noticeable drop in Alaska salmon production during 1953 was of great concern to packers and conservationists alike. The one bright spot in the otherwise dismal salmon picture was the 23-million-pound rise in salmon production in the Pacific Coast States during the year. The 1953 Pacific sardine fishery in California was even a more dismal failure than the 1952 season since a total of only 9 million pounds were taken during the year compared with 14 million pounds reported in this fishery during the previous year. The Pacific Coast mackerel fishery also continued its steady decline with the catch of this item amounting to less than 8 million pounds compared with

nearly 21 million pounds in 1952. However, the 86-million-pound catch of anchovies in California was the largest in history. The pack of canned fishery products in the United States, Alaska, Hawaii, and Puerto Rico in 1953 amounted to 792 million pounds valued at nearly \$307 million to the packers -- a decrease of 3 percent in quantity but an increase of less than one percent in value compared with 1952. Sharply reduced packs of salmon and Pacific Coast sardines were largely responsible for the volume of the pack total falling below that of several recent years; however, record packs of tuna and anchovies were canned during the year. The production of fishery byproducts in the United States and Alaska during 1953 was valued at over \$74 million -- 9 percent more than the value for 1952. Lewes, Del., was the nation's leading fishing port poundagewise during 1953, with receipts of approximately 363 million pounds consisting almost entirely of menhaden. San Pedro, Calif., was in second place with 329 million pounds, mostly tuna, followed by Port Monmouth, N. J., with 198 million pounds of fishery products, comprised mostly of menhaden. Fishery statistics of the United States and Alaska are compiled and published annually to make available information on both the economic and biological aspects of the domestic commercial fisheries. Data on the economic aspects are necessary to persons engaged in the commercial fishery and to governmental agencies concerned with its regulation and protection. From the biological standpoint, these data are important to sound fishery management in providing detailed information on fluctuations in the commercial catch by species, locality, gear, and on the type of gear and craft operated. They assist conservation agencies in regulating the commercial fisheries so as to produce maximum yields without depletion.

Laws and Regulations for Protection of the Commercial Fisheries of Alaska, 1956, Regulatory Announcement 48, 79 pp., printed, April 1956, 25 cents. This publication is divided into two sections. One section contains laws for the protection of the commercial fisheries of Alaska and related information, including the authority for regulation, rules regarding oyster culture, Bristol Bay residence requirements, regulation of salmon escapement, fishing-gear restrictions, exceptions to weekly closed seasons, etc. The second section contains all the regulations for the protection of the commercial fisheries of Alaska amended to date and which became effective April 21, 1956. These 1956 regulations supersede the regulations published in Regulatory Announcement 45 which became effective February 19, 1955.

Method of Evaluating Temperature in Lakes with
Description of Thermal Characteristics of Convict Lake, California, by Norman Reimers and
Bobby D. Combs, Fishery Bulletin 105 (From
Fishery Bulletin of the Fish and Wildlife Service, vol. 56), 22 pp., illus., printed, 20 cents,
1956.

THE FOLLOWING SERVICE PUBLICATIONS ARE AVAILABLE ONLY FROM THE SPECIFIC OFFICE MENTIONED IN THE REVIEW.

California Fishery Products Monthly Summary,
April 1956, 10 pp.; California Fishery Products
Monthly Summary, May 1956, 10 pp. (Market
News Service, U. S. Fish and Wildlife Service,

Post Office Bidg., San Pedro, Calif.)California cannery receipts of raw tuna and tunalike fish, herring, and squid; pack of canned tuna, mackerel, herring, anchovies, and squid; market fish receipts at San Pedro.

- Gulf Monthly Landings, Production, and Shipments of Fishery Products, April 1956, 5 pp., Gulf Monthly Landings, Production, and Shipments of Fishery Products, May 1956, 5 pp. (Market News Service, U.S. Fish and Wildlife Service, 609-611 Federal Bldg., New Orleans 12, La.) Gulf States shrimp, oyster, finfish, and blue crab landings; crab meat production; LCL express shipments from New Orleans; and wholesale prices of fish and shellfish on the New Orleans French Market; for the month indicated.
- (New York) Monthly Summary April 1956 Receipts of Fishery Products at the New York
 City Wholesale Salt-Water Market, 4 pp. (Market News Service, U. S. Fish and Wildlife
 Service, 155 John St., New York 38, N. Y.)
 Receipts in the salt-water section of the Fulton
 Fish Market by species and by states and provinces for the month indicated.
- Monthly Summary of Fishery Products Production in Selected Areas of Virginia, North Carolina, and Maryland, May 1956, 4 pp. (Market News Service, U. S. Fish and Wildlife Service, 18 S. King St., Hampton, Va.) Fishery production for the Virginia areas of Hampton Roads, Lower Northern Neck, and Eastern Shore; the Maryland areas of Crisfield, Cambridge, and Ocean City; and the North Carolina areas of Atlantic, Beaufort, and Morehead City; together with cumulative and comparative data; for the month indicated.
- (Seattle) Monthly Summary Fishery Products, May 1956, 5 pp. (Market News Service, U. S. Fish and Wildlife Service, 421 Bell St. Terminal, Seattle 1, Wash.) Includes landings and local receipts as reported by Seattle and Astoria (Oregon) wholesale dealers.
- (Chicago) April 1956 Monthly Summary of Chicago's Fresh and Frozen Fishery Products Receipts and Wholesale Prices, 10 pp. (Market News Service, U. S. Fish and Wildlife Service, 565 W. Washington St., Chicago 6, Ill.) Receipts at Chicago by species and by states and provinces; fresh-water fish, shrimp, and frozen fillet wholesale market prices; for the month indicated.
- "Oyster Bulletins," processed. (Available free from the Fishery Biological Laboratory, U. S. Fish and Wildlife Service, Milford, Comn.) As in previous years, a series of bulletins are issued during the summer with information of practical importance and interest to the oyster growers of Long Island Sound. These bulletins describe the progress of accumulation and quantity of spawn in oysters during the prespawning and spawning periods, report on the intensity of spawning of the oyster population at different depths of Long Island Sound, and report on the beginning and intensity of setting in different sections of Long Island Sound. Also included is information on the survival and rate of growth of recently set oysters, growth of oysters with damaged shell edges, and other

facts that may be of interest to oyster culturists. The bulletins are titled: "Observations on Gonad Development, Spawning and Setting of Oysters and Starfish in Long Island Sound."

MISCELLANEOUS PUBLICATIONS

THESE FUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT "USUALL" MAY BE OBTAINED FROM THE DROAM FLE ORGANIZATION ISSUING THEM, CORRESPONDENCE RECARDING PUBLICATIONS THAT FOLLOW SHOULD BE ADDRESSED TO THE RESPECTIVE ORGANIZATION OR PUBLISHER MENTIONED, DATA ON PRICES, IF REDLIX TAXILABLE, ARE SHOWN.

- Actividades Pesqueras en la Republica Argentina y Posibilidades de Incrementar el Consumo de Pescado (Fishery Activities in the Argentine Republic and Possibilities for Increasing the Consumption of Fish), by Carlos Gonzalez, Publicacion Miscelanea no. 415, 43 p., illus., printed in Spanish. Ministerio de Agricultura y Ganaderia, Departmento de Investigaciones Pesqueras, Buenos Aires, Argentina, 1956.
- Artes y Metodos de Pesca (Primer Curso) (Fishing Techniques and Methods--First Course), by Jose A. Suarez Caabro, 115 pp., illus., printed. Academia Nacional de Patrones, Marina de Guerra, Havana, Cuba, 1955. Discusses oceanography, plankton, fish concentrations, locating fish, various types of fishing, and other information of value to fishermen.
- "The Battle of the Bergs," by Jesse C. Burt, article, Natural History, vol. LXV, no. 4, April 1956, pp. 186-191; illus., printed, single copy 50¢. American Museum of Natural History, Central Park West at 79th St., New York 24, N. Y. An interesting article about the icebergs of the North Atlantic which are a menace to the fishermen of the Grand Banks of Newfoundland who fish for cod and haddock. The International Ice Patrol has made the sea lanes safe; now scientists are weighing the practicality of towing large bergs to the rescue of drought-stricken areas.
- "Biology of the Red Salmon, Oncorhynchus nerka
 (Walbaum) of Bristol Bay, Alaska, as Revealed
 by a Study of Their Scales," by Ted. Swei-yen
 Koo, p. 1681, printed. Dissertation Abstracts,
 vol. 15, no. 9, Univ. Microfilms, Ann Arbor,
 Mich., 1955.
- "Boston Firm Uses Fermented Fish in New Soil Fertilizer," by J. Bunker, article, <u>Maine Coast</u> <u>Fisherman</u>, vol. 7, no. 6, January 1953, p. 8, printed. Maine Coast Fisherman, Journal Bldg., Belfast, Me.
- A Check List of the Fishes of Iowa with Keys for Identification, by Reeve M. Bailey, 52 pp., illus., printed. (Reprinted from Iowa Fish and Fishing, 1951, pp. 187-237.) Iowa State Con-Commission, Des Moines, Iowa. A revised check list of fishes of Iowa with keys for identification which are also revised. This list comprises 25 families, 61 genera, 133 species, and 137 total kinds, including subspecies, of native fishes. In addition, four exotic species (brown trout, rainbow trout, carp, and goldfish) have become established and are included in the list.

- "Coagulating Agents for Use in Herring Reduction: Calcium Chloride-Formalin," article, Meldingof fra SSF, no. 6, October 1951, p. 117, printed in Norwegian. Sildolje-og Sildemelindustriens Forskingsinstitut, Bergen, Norway.
- "A Comparison of Alternating and Direct Electric Currents in Fishery Work," by Dwight A. Webster, John L. Forney, Robert H. Gibbs, Jr., Jack H. Severns, and William F. Van Woert, article, New York Fish and Game Journal, vol. 2, no. 1, January 1955, pp. 106-113, printed. Conservation Department, Broadway Arcade Bldg., Albany, N. Y.
- The Conservation Yearbook 1955-1956, edited by Erle Kauffman, 306 pp., illus., printed, \$7.50. Cornwell, Inc., 1025 Connecticut Ave. NW., Washington 6, D. C. A directory and guide to the conservation of renewable natural resources (including fisheries) and to the conservation agencies and organizations.
- Contribution to the History of Fishing in the Southern Seas, by Bengt Anell, Studia Ethnographica Upsaliensia IX, 249 pp., illus., printed, £5 (US\$14). Almqvist & Wiksell, Stockholm, Sweden, 1955. The first part of this work deals with the following tackle: thorn-lined trap plunge-basket, casting net, fishing kite, pole snare, shark snare, and harpoon. As regards their distribution and possible origin they may be divided into two groups, one of which consists of implements characteristic for the tropical areas, and in Oceania chiefly to be found in Melanesia; the other group includes implements which in Oceania are mainly recorded from Polynesia and Micronesia, and which outside Oceania are known chiefly from the northern regions. The author states in the introduction that "The main principle has been to choose a number of fishing implements, the distribution and use of which could be regarded as interesting from an ethnographical point of view. Less attention has been paid to their purely economic importance. Further, it was of particular interest to study the Oceanic distribution of some implements, the occurrence of which in other parts of the world has already been accounted for, e. g. the casting net and the plunge-basket. It is quite obvious that an investigation of the present kind is intended to contribute at the same time, in some measure, to the solution of the current problems of Oceanic ethnography. Although the largest part of the present work deals with the fishing of Oceania, I have also investigated, to a certain degree, the extra-Oceanic distribution of the fishing tackle in question. In this respect special attention has been devoted to the regions along the shores of the Pacific and Indian Oceans. In order to reconstruct the probable diffusion of the Oceanic implements, it is necessary to fit them into a wider context. In doing so it may be possible to realize what is characteristic of Oceanic fishing and what may be ascribed to alien influence. One may also be able to localize the parts of the world from where the main influences emanate and study the evolutionary tendencies. The brief surveys made here are by no means exhaustive and undoubtedly there exists a richer material."

- Creatures of the Deep Sea, by Klaus Gunther and Kurt Deckert, translated by E. W. Dickes, 222 pp., illus., printed, \$3.95. Chas. Scribner's Sons, 597-599 5th Ave., New York 17, N. Y.
- Dehydration of Fish, by C. L. Cutting and G. A. Reay, with a chapter by J. M. Shewan, Food Investigation Special Report No. 62, 175 pp., illus., printed, 7s. 6d. net (US\$1.04). Department of Scientific and Industrial Research (Available from Her Majesty's Stationery Office, London, England, 1956). This report describes in detail the various attempts that were made and the development to a commercial scale of a dehydration process for drying minced cooked herring and white fish in warm air. The experiments were carried out on a pilot-plant scale by the Torry Research Station of the Department of Industrial and Scientific Research and the Ministry of Food. It includes discussions on the preliminary examination of various methods of drying; warm-air drying of minced cooked fish--development of the experimental dehydration process and products; commercial-scale dehydration of fish; physical data for dehydrated fish; density, food equivalent, transport requirements, and compression of dehydrated fish; storage properties of dehydrated fish; reconstitution and utilization; bacteriology of dehydrated fish in production and use; factors affecting the cost of dehydrated fish; and the future of fish dehydration.
- (East Pakistan) Fishing Craft of East Pakistan, by Nazir Ahmad, 9 pp., illus., printed. Directorate of Fisheries, Government of East Bengal, Dacca, East Bengal, 1955. Describes and illustrates the different kinds of fishing boats used in East Pakistan. These craft differ in length, breadth, depth, and other details from district to district, but have one common characteristic and that is that all of them are of light build and highly buoyant. An attempt is made to classify them by taking into consideration the gear used by them as well as their shape, etc.
- "Effects of Rapid Direct Current Pulsations on Fish," by David C. Haskell and William J. Adelman, article, New York Fish and Game Journal, vol. 2, no. 1, January 1955, pp. 95-105, printed. Conservation Department, Broadway Arcade Bldg., Albany, N. Y.
- Effect of Some New Insecticides on Fish and Wildlife, by James R. Fielding and William P. Baldwin, 16 pp., printed. (Reprinted from the 1955 Pesticide Handbook.) The N. C. Agricultural Extension Service, University of North Carolina, Chapel Hill, N. C., 1955.
- "An Electric Trawl," by David C. Haskell, Donald Geduldig and Edward Snoek, article, New York Fish and Game Journal, vol. 2, no. 1, January 1955, pp. 120-125, printed, single copy 75 cents. New York Fish and Game Journal, New York Conservation Dept., Albany, N. Y. Various problems encountered in attempting to develop an electric trawl for deep water are discussed. A method involving two pairs of electrodes operated by portable alternating current generators proved successful in collecting warm-water species.

- Enquete Generale sur les Positions Statistiques des Usines Francaises de Conserves de Poissons des Cotes de la Manche et de l'Ocean au Cours de L'Annee 1954 (General Review of the Statistical Position of French Fish Canners for 1954), 8 pp., printed in French. Federation Nationale des Syndicats Francais de Conserveurs des Produits de la Mer, Paris, France. Packs and raw fish received for sardines, tuna, mackerel, herring, anchovies and sprats, and other canned fish and shellfish. Includes amount of raw materials used, number of employees, salaries, and other data.
- Estatistica Brazileira da Pesca, 1950-54 (Statistics on Brazil's Fishing Industry, 1950-54), 23 pp., processed. Servico de Estatistica da Producao, Ministerio da Agricultura, Rio de Janeiro, Brazil, 1954.
- Farm Fish Ponds in New Zealand, Fisheries Lab.
 Publ. No. 23, 6 pp., printed. New Zealand
 Marine Department, Wellington, New Zealand,
 1954.
- "Farm Ponds for Food and Fun," by James V. Stoddard, article, Wyoming Wildlife, vol. 19, no. 8, August 1955, pp. 22-26, printed. Wyoming Game and Fish Commission, Box 378, Cheyenne, Wyo.
- The First Book of Sea Shells, by Betty Cabanna, 39 pp., illus., printed, \$1.95. Franklin Watts, Inc., 699 Madison, New York 2, N. Y., 1955.
- "Fish By-Products," article, <u>D.S.I.R. Food Investigation Report for the Year 1952</u>, p. 36, printed. H. M.S.O., York House, Kingsway, London, W. C. 2, England, 1953.
- Fisheries Research Papers, vol. I., no. 4, March 1956, 79 pp., illus., printed. Washington Department of Fisheries, 4015 20th Avenue West, Seattle 99, Wash. Contains the following articles: "A Comparison of Otoliths and Interopercular Bones as Age Indicators of English Sole," by Arthur T. Palmen; "Migratory Habits of Pink Salmon in the Tacoma Narrows Area of Puget Sound," by Hans M. Jensen; "Retention of Pacific Oyster Larvae in an Inlet with Stratified Waters," by Ronald E. Westley; "Recoveries of Immature Chum Salmon Tagged in Southern Puget Sound," by Hans M. Jensen; "A Proposed Correction of Migratory Fish Problems at Box Culverts," by W. R. McKinley and R. D. Webb; "Tests on Hauling as a Means of Reducing Downstream Migrant Salmon Mortalities on the Columbia River," by C. H. Ellis; "Introduction of a Japanese Alga, Sargassum muticum, into the Northeast Pacific," by Robert F. Scagel; "An Appraisal of the Fish Ticket System in Respect to the Washington Otter Trawl Fishery," by Dayton L. Alverson, and "New Tattooing Devices for Marking Juvenile Salmon," by William A. Dunstan and Wallace E. Bostick.
- Fishery Cooperatives in Canada, by Rafael Mora Rubio, 28 pp., illus., processed. Cooperatives Section, Division of Labour and Social Affairs, Department of Economic and Social Affairs,

- Pan-American Union, Washington, D. C. Presents a study which analyzes important aspects of technical, economic, and financial problems of fishery cooperatives in the Canadian Provinces of Nova Scotia and Quebec. The problems of plant and equipment, scientific investigation, and education and training of fishermen are the three principal points of interest discussed under the technical problems which confront fishermen's cooperatives in Quebec and Nova Scotia. In the section on economic problems are discussions on income and markets which are both very important in the correct planning of a fishery cooperative. The financial problems, which are the most chronic and acute, begin with the organization of the cooperative. These problems are discussed, and the general opinion is that they can be avoided or minimized by means of sound economic and financial planning.
- "Fish Handling and Processing in Europe--Fish By-Products," by W. A. Empey, article, <u>Fish-eries Newsletter</u>, vol. 12, no. 6, June 1953, p. 11, printed. Fisheries Newsletter, Box 2595, G. P. O. Sydney, Australia.
- (FAO) Sampling Technique for Estimating the Catch of Sea Fish in India, by P. V. Sukhatme, V. G. Panse, and K. V. Sastry, FAO Rept. 55/6/3791, 26 pp., processed. Food and Agriculture Organization of the United Nations, Rome, Italy, 1955.
- (FAO) "Technical Service Assists World's Underdeveloped Fisheries," article, The South African Shipping News and Fishing Industry Review, vol. XI, no. 4, April 1956, pp. 61 and 63 illus., printed. Odhams Press, South Africa (Pty.) Ltd., P. O. Box 2598, Cape Town, South Africa, Under the heading of technical assistance the Food and Agriculture Organization of the United Nations is helping to boost the productivity of thousands of fishermen in underdeveloped fisheries throughout the world. This article describes the growth of the technical assistance work of FAO's Fisheries Division and how it covers activities in all phases of fisheries. In 1950 funds were made available to extend and intensify technical assistance in modernizing the fisheries of underdeveloped countries, and since then projects in this field have been conducted in more than 30 countries.
- Guide for Sport Fishermen, 1956-1957 Local Fishing Guide, illus., printed, 50 cents for each booklet. Foster Publications, Inc., 165 Broadway, New York, N. Y. A series of booklets providing complete information for the following group of states on when, where, and how to fish in local waters: (1) Pacific Salt Water Annual; (2) Florida-Gulf States Annual; (3) Pacific Fresh Water Annual; (4) Eastern Salt Water Annual; (5) Eastern Fresh Water Annual; (6) Great Lakes States-Canadian Annual.
- The Hardshell Clam Fishery of Maryland Waters, by F. W. Sieling, I p., illus., printed. (Reprinted from Maryland Tidewater News, vol. 12, no. 10, supplement no. 9, March 1956.) Maryland Department of Research and Education, Chesapeake Biological Laboratory, Solomons, Md.

- Important Potomac River Fishes Recorded from Marine and Fresh Waters Between Point Lookout, St. Mary's County, and Little Falls, Montgomery County, Maryland, with a Bibliography to Potomac Fisheries, by Romeo Mansueti, 12 pp., processed. Maryland Department of Research and Education, Chesapeake Biological Laboratory, Solomons, Md., January 1955. A list of the important Potomac River fishes with general notations of habitat, movements, time of occurrence, spawning, rate of abundancy average size, whether or not covered by Maryland law, and whether introduced or native. Also contains a list of the most important references on the Potomac River fisheries giving information on the kinds of fish, their distribution, life history, ecology, and economic value.
- Import Tariff System of the Philippines, World
 Trade Information Service Operations Report
 no. 56-32, Part 2, 4 pp., printed, 10 cents.
 U. S. Department of Commerce, Washington 25,
 D. C.
- (India) Annual Report of the Department of Fisheries, Bombay State, for the Year 1954-55, 71 pp., illus., printed. Government Book Depot, Charni Road Gardens, Bombay 4, India, 1956. Reports on the marine fisheries, fishcuring yards, fisheries schools, fresh-water fisheries, technological studies, and socioeconomic work. Statistics are also included on the different varieties and quantities of fish landed in 1954-75.
- Informe sobre las Explotaciones Camaroneras de los Estados Unidos Mexicanos, dedicado al H. Presidente de la Republica Don Adolfo Ruiz Cortines (Notes on the Exploitation of Shrimp in the United States of Mexico, Dedicated to the President of the Republic, Don Adolfo Ruiz Cortines), Boletin Informativo, vol. XV, no. 3 February 1955, 24 pp., illus., printed in Spanish. Centro de Estudios Pesqueros de las Industrias Mexicanas, S. C., Mexico, D. F.
- (ICA) Operations Report, December 31, 1955, FY 1956, Issue No. 2, 65 pp., illus., processed. Office of Statistics and Reports, International Cooperation Administration, Washington 25, D. C.
- An Introduction to Echosounding, 126 pp., illus., printed. Elac-Electroacustic G.m.b.H., Kiel, Germany, 1955. For more than a quarter century, the echo-sounder has been an indispensible aid to navigators. Its ability to supply depth measurements in practically all weather without impeding the crew's activities gives it a distinct advantage over the earlier lead-line sounding technique. This particular feature has made it invaluable for finding the ship's position and has reduced the risk involved in maneuvering near coastal and shoal waters. With echosounders, trawlers can fish along shelving coasts and banks once considered too dangerous for their operation. Due to improvements and innovations in the equipment, echosounders now are able to find fish. The advantages this brings to the fishing trade are obvious. Nets need no longer be shot haphazard

- because the new method makes it possible to detect fish more rapidly and with less trouble than by test catches. In ground net trawling, these modern "fish-finding sounders" are further useful in that they enable the skipper to steer clear of wrecks or rocks which would tear his net. They also facilitate estimating during trawling how full a net may be. Mid-water trawling has been made possible for the first time through the invention of fish-finding sounders. Without them, nets could not be lowered with any degree of certainty to the level above the seabed where a shoal of fish is located. This booklet discusses in considerable detail the meaning of sound, the use of ultrasound, sounding technique and sounder principles, factors limiting accuracy of measurement, sounding technique, graph indication, interpretation of indications, and indications of fish.
- "Introduction of Edible Pond Fish from Philippines." by H. Van Pel, article, SPC Quarterly Bulletin, vol. 6, no. 1, January 1956, p. 17, illus., printed. South Pacific Commission, Box 5254, G.P.O., Sydney, Australia. Fingerlings of three species of edible pond fish, taken from nurseries in Manila, were flown to New Caledonia in October 1955 to stock experimental fish-breeding ponds there. This article describes the operation.
- "Investigation & Management of the Atlantic Salmon in 1955," article, <u>Trade News</u>, vol. 8, no. 10, April 1956, pp. 3-16, <u>illus</u>, printed. Department of Fisheries of Canada, Ottawa, Canada. Includes two articles which review the progress made in 1955 on the research and management program aimed at increasing Canada's Atlantic salmon resources. The first article, dealing with the research program, is by Dr C. J. Kerswill of the Fisheries Research Board of Canada's Biological Station at St. Andrews, N. B., and the second article, dealing with the management program is by Dr. W. M. Sprules of the Conservation and Development Service, Department of Fisheries, Ottawa. An attempt is made to show the purpose of each activity, and the significance of both the additions to knowledge through investigation and the accomplishments through management activities.
- "The Isolation from Shark (Galeorhinus australis) Liver Oil of a Multi-Branched C₁₈ Saturated Fatty Acid Fraction," by Isobel M. Morice and F. B. Shorland, article, Chemistry and Industry, 1952, pp. 1267-1268. (Reprints are available from the New Zealand Scientific Liaison Office, Room 409, 1907 K St. NW., Washington 6, D. C.)
- (Japan) Tokai Regional Fisheries Research Laboratory, Special Publication No. 5, 27 pp., illus., printed. Tokai Regional Fisheries Research Laboratory, Tsukishima, Chuo-ku, Tokyo, Japan. Contains the following articles by Zinziro Nakai: "The Recent Sea Fisheries in Japan and their Resources;" "Recent Trends in Plankton-ological Researches in Japan;" and "The Chemical Composition, Volume, Weight, and Size of the Important Marine Plankton."

- Key to the Fresh Water Fishes of Texas, by Clark Hubbs, 30 pp., processed. Texas Fish and Game Commission, Austin, Tex., 1955.
- "La Pesca del Atun en las Costas de Africa" (Tuna Fishery off the Coasts of Africa), by E. P. Postel, article, <u>Puntal</u>, vol. III, no. 24, March 1956, pp. 8-10, illus., printed in Spanish, 10 pesetas (US\$0.04). Puntal, Alicante, Spain.
- La Pesca del Atun, y sus Posibilidades en el Golfo de Mexico (The Tuna Fishery and Its Possibilities in the Gulf of Mexico), by Jorge Carranza, no. 11, 33 pp., illus., printed in Mexican. Instituto Mexicano de Recursos Naturales Renovables, A. C., Mexico, D. F., Mexico.
- "Liquid Fertilizers Lead in New Applications of Fish By-Products," article, <u>Journal of Agricultural and Food Chemistry</u>, vol. 1, no. 3, April 1953, pp. 206, 229, printed. Journal of Agricultural and Food Chemistry, 20th and Northampton Sts., Easton, Pa.
- A Manual Piston Coring Device for Use in Shallow Water, by Robert N. Ginsburg and R. Michael Lloyd, 4 pp., illus., printed. (Reprinted from the Journal of Sedimentary Petrology, vol. 26, no. 1, March 1956, pp. 64-66) The Marine Laboratory, University of Miami, Coral Gables, Fla.
- Meddelelser fra Danmarks Fiskeri-og Havundersøgelser (Reports from Denmark's Fishery and
 Ocean Research), Ny Serie, vol. 1, nos 2-8,
 illus., printed in English with summaries in
 Danish, 15 Kr. (US\$2.17). Danmarks Fiskeriog Havundersøgelser, Charlottenlund Slot, Denmark, 1954. Contains the following reports:
 No. 2-"On the Quantities of Macroplankton in
 the North Atlantic," by P. Jespersen, 12 pp.;
 No. 3-"Is there any Correlation Between Metabolism and Number of Vertebrae (and Other
 Meristic Characters) in the Sea Trout (Salmo
 trutta trutta L.)?" by Knud Marckmann, 9 pp.;
 No. 4-"Foul Taste of Fish and Oysters Caused
 by Chlorophenol," by Jan Boetius, 8 pp.; No. 5"On the Life History of Halibut in Faroe Waters," by J. S. Joensen, 25 pp.; No. 6-"Electrofishing of Sea Trout for Stripping," by Knud
 Larsen, 12 pp.; No. 7--"Efficiency of Marine
 Bottom Samplers of the van Veen and Petersen
 Types," by Erik Ursin, 8 pp.; and No. 8"Planktological Contributions I," by Jul. Grontved, 7 pp.
- "A Method for Removing the Effect of Recruitment on Petersen-Type Population Estimates," by Richard A. Parker, article, Journal of the Fisheries Research Board of Canada, vol. 12, no. 3, May 1955, pp. 447-450, printed. Queen's Printer and Controller of Stationery, Ottawa, Canada.
- My Hobby is Collecting Sea Shells and Coral, by Ruth H. Dudley, 127 pp., illus., printed, \$2.95. Hart Publishing Co., Inc., 670 5th Ave., New York 19, N. Y., 1955.
- "Nitrogen Secretion in the Swimbladder of Whitefish," by P. F. Scholander, L. van Dam, and Theodore Enns, article, <u>Science</u>, vol. 123,

- no. 3185, January 13, 1956, pp. 59-60, printed. Science, 1515 Massachusetts Ave. NW., Washington 5, D. C. Results of analyses of swimbladder gas of whitefish are given. The authors state, that "The swimbladder gas in our deepwater coregonid consists of some 99 percent pure nitrogen gas... The deposition of nitrogen and argon against considerable concentration gradients in the swimbladder of fishes suggests, in the absence of other explanations, the possibility of a cellular mechanism for the secretion of inert material."
- "The Noisy Underwater World," by Joseph Bernstein, article, Natural History, vol. LXV, no. 4, April 1956, pp. 192-195, 224, illus., printed, single copy 50 cents. American Museum of Natural History, Central Park West at 79th St., New York 24, N. Y. This article describes the scientific investigations of the underwater sounds caused by fish and shellfish and the different noises they make. The hydrophone is the basic instrument in the study of underwater sounds. It is nothing more or less than a microphone adapted for underwater use. Like all microphones, it magnifies the sound it picks up. The sound is then fed into an analyzer unit, which separates it into its basic components. The sounds are recorded either on discs or tape. These records can, of course, be played back, so that the various characteristics can be studied in detail and compared with other sounds. Where the noise is a confused jargon, the analyzer serves to separate the individual sounds according to the different octaves. Each pitch-range can then be separately recorded. In this way it is possible to isolate and identify the different noise producers. "Although the natural history of sonic marine animals is barely out of its swaddling clothes as a science," states the author, "many practical applications have already been made, and still more are in the offing. Experts will be able to predict what underwater sounds can be expected in various areas at different seasons, and the operators of the Navy's listening devices can then swiftly screen out biological interference from more ominous noises.
- "Notes on the Seaward Migration of Pink and Chum Salmon Fry," by Ferris Neave, article, <u>Journal</u> of the <u>Fisheries Research Board of Canada</u>, vol. 12, no. 3, May 1955, pp. 369-374, printed. Queen's Printer and Controller of Stationery, Ottawa, Canada.
- Nova Scotia Directory of Fish Processors and Packers, 1956, 30 pp., printed. Fisheries Division, Department of Trade and Industry, Halifax, Nova Scotia. This is a directory of producers in Nova Scotia and the products they prepare or pack rather than a directory of dealers and all the products they may have for sale. The names and addresses of the firms are shown as processors and packers of cod and other groundfish, herring, mackerel, alewives, salmon, swordfish, tuna, lobsters, clams, scallops, and producers of liver oil and liver meal and other fishery byproducts.

- On the Methodology of Marine Plankton Collection, with a Suggested Classification, by Z. Nakai, 7 pp., printed. (Reprinted from Symposium on Marine and Fresh-water Plankton in the Indo-Pacific, 1954), Tokai Regional Fisheries Research Laboratory, Tokyo, Japan.
- Our Natural Resources -- and Their Conservation, by Richard L. Neuberger, pamphlet no. 230, 28 pp., 25 cents. Public Affairs Committee, New York, N. Y., 1956.
- Pacific Halibut Fishery Regulations (Effective April 18, 1956), 12 pp., printed; and Memoradum on 1956 Pacific Halibut Fishery Regulations, 7 pp., processed. International Pacific Halibut Commission, Fisheries Hall No. 2, University of Washington, Seattle 5, Wash., April 1956.
- Penobscot River Salmon Restoration, by W. H. Everhart, J. E. Watson, and R. E. Cutting, 13 pp., processed. Department of Inland Fisheries and Game, State House, Augusta, Maine, March 1955.
- Preliminary Observations on Effects of 1954 DDT Spraying on Miramichi Salmon Stocks, by C. J. Kerswill and P. F. Elson, Progress Reports of the Atlantic Coast Stations, no. 62, July 1955, 43 pp., printed. Fisheries Research Board of Canada, Ottawa, Canada.
- "A Procedure for Installation of Fishways at Natural Obstructions," by C. H. Clay, article, The Canadian Fish Culturist, Issue 17, September 1955, pp. 1-12, printed. Department of Fisheries, Information and Educational Service, Ottawa, Canada.
- Producao de Conserva, Salga e Oleo de Peixe, 1954 (Production of Canned Fish, Salted Fish, and Fish Oil, 1954), 37 pp., processed. Servico de Estatistica da Producao, Ministerio da Agricultura, Rio de Janeiro, Brazil, 1954.
- Production and a Pelagic Fishery, by D. H. Cushing, Fishery Investigations, Series II, vol. XVII, no. 7, 112 pp., printed, \$2.25. British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. In every ocean there are large stocks of pelagic species of fish that are only exploited at their fringes. For example, pilchards, or closely related species, extend from the English Channel to the Cape of Good Hope and are fished only at a few points in their distribution. Among such fisheries there has been from time immemorial one for herring in summer in the northern North Sea. Work of previous authors has made it reasonably certain that the major interest of the fish is in feeding on the common copepod Calanus finmarchicus Gunner. In this fishery there seems a fair possibility of reaching an understanding of those factors that govern success or failure and the present paper attempts the first steps towards achievement of that understanding.
- Progress Report of the Cooperative IWASHI Resources Investigations, April 1949-December 1951, by Zinziro Nakai, Shuzo Usami, Shigemasa Hattori, Koji Honjo, and Shigeichi

- Hayashi, 116 pp., illus., printed. Tokai Regional Fisheries Research Laboratory, Tsukishima, Chuo-ku, Tokyo, Japan, September 1955. In Japan, the commercial name <u>iwashi</u> generally refers to three different species of fish--sardine, <u>Sardinops melanosticta</u>; anchovy, <u>Engraulis japonica</u>; and round herring, <u>Etrumeus micropus</u>. The iwashi holds first place in the total landings of fish belonging to Class Pisces. Being caught in waters all along the coastal areas of the Japanese Islands, these fish play an outstanding role not only in the economy of fishing villages throughout the country but also in the nation's nutritional requirement as a valuable yet readily available source of animal protein. The ultimate objective of the present investigation program is to contribute to the establishment of a conservation policy of the iwashi resource and forecasting prospects of the fisheries. Of the species of fish designated in the present investigation program, emphasis was placed on the sardine, the most important species. In the regions where the anchovies were caught, considerable amount of effort was paid to studies of these fish since they have become a significant item of commercial importance on the Pacific coasts in recent years, while the round herring, whose catch was the least of the three, was treated as a minority. Discussions of the spawning surveys, morphometric surveys, and age composition surveys of catch are presented.
- Protokolle zur Fischereitechnik (Journal of Fishery Technology), Heft 16, Bd. 4 (vol. 4, no. 16), 31 pp., illus., processed in German. Institut fur Netz- und Materialforschung, Hamburg 36, Neuer Wall 72, Germany, December 1955.
- Report on Additional Studies of Pollution in Biscayne Bay to Federal Security Agency, Public Health Service, National Institutes of Health, under Grant RG-4062 (c2), by J. Kneeland, Progress Report 56-6, 25 pp., processed. The Marine Laboratory, University of Miami, Coral Gables, Fla., February 1956.
- Report on the British Fishing Industry, Distant
 Water Trawlers, 1955, 28 pp., illus., printed.
 The British Trawlers' Federation, Hull, England. A report on Britain's distant-water
 fleet in 1955 shows that trawling costs rose
 sharply, fishermen's earnings increased, and
 yet by greater productivity and higher efficiency the price of fish remained stable. Includes
 discussions and statistics on landings and
 prices, imports of foreign-caught fish, fishermen's earnings, vessel and crew losses, capital cost of fleet, and operations at Hull, Grimsby, and Fleetwood.
- "The Resistance to Salt Water Corrosion of Various Types of Metal Wire Used in the Tagging of Flatfish," by C. R. Forrester and K. S. Ketchen, article, Journal of the Fisheries Research Board of Canada, vol. 12, no. 1, January 1955, pp. 134-142, printed. Queen's Printer and Controller of Stationery, Ottawa, Canada.
- Revista del Frio (Refrigeration Review), vol. 1, no. 1, January-March 1956, 100 pp., illus., printed in Spanish. Centro Experimental del Frio, Serrano, 150, Madrid, Spain.

- (Scotland) Report on the Fisheries of Scotland, 1955, Scottish Home Department, Cmd. 9739, 772 pp., printed, 3s. (42 U. S. cents). Her Majesty's Stationery Office, Edinburgh, Scotland, April 1956. A report of Scotland's fisheries, with statistical data for the year 1955. Contains total production figures by species and by port (both comparative and historical), and information on the number of boats, personnel, and methods of capture. Production and value of lobsters, crabs, mussels, oysters, and scallops, and fishery byproducts are also included. Sections are also devoted to discussions of the herring, white fish, and salmon fisheries, marine fisheries law enforcement, scientific investigations, and construction and improvement of harbors.
- Scottish Sea Fisheries Statistical Tables for 1955, 48 pp., printed, 4s. 6d. net (about 62 U. S. cents). Scottish Home Department (Available from Her Majesty's Stationery Office, Edinburgh, Scotland), April 1956. Statistics on the Scottish fisheries for 1955 are presented. The amount and value of the fish catch by species, by type of vessels, and by districts; utilization of the catch; number and type of fishing vessels by districts; and number of fishermen employed are some of the statistical data included.
- Sea Fisheries Research Notes, 1955, Fisheries
 Notice No. 35, 12 pp., printed. Ministry of
 Agriculture, Fisheries and Food, Whitehall
 Place, London, S. W. 1, England, February
 1956. Brief news items on fishery research
 conducted during 1955 by the British Ministry
 of Agriculture and Fisheries. A list of scientific and other papers issued by the Ministry
 is included.
- "Some Observations on the Movement of Pacific Salmon Fry through a Small Impounded Water Basin," by D. MacKinnon and J. R. Brett, article, Journal of the Fisheries Research Board of Canada, vol. 12, no. 3, May 1955, pp. 362-368, printed. Queen's Printer and Controller of Stationery, Ottawa, Canada.
- "Studies Relating to the Validity of the Scale Method for Age Determination of the Northern Anchovy (Engraulis mordax)," by Daniel J. Miller, Fish Bulletin No. 101, pp. 6-34, printed. California Department of Fish and Game, Marine Fisheries Branch, Sacramento 14, Calif., 1955.
- "A Study of the Effects of Aureomycin-Containing Sea Water and Ices Upon the Storage Life of Round Herring," by Tetuo Tomiyama, Shunichi Kuroki, Denki Maeda, Seiji Hamada, and Akira Honda, article, Food Technology, vol. 10, no. 5, May 1956, pp. 215-218, printed. The Garrard Press, 119 West Park Ave., Champaign, Ill. Describes a study made of various procedures for treatment with aureomycin of round herring just after being caught. A remarkable prolongation of storage life of round herring resulted from the treatment by either storage in sea water containing ice and aureomycin (10 p.p.m.) on the boat, storage in an aureomycin-containing ice (p.p.m.) after landing, or their combination. A combination of the

- storage in aureomycin-sea water and holding in aureomycin-ice was found to prolong the storage life approximately 90 percent more than the control without treatment when stored at 15° to 20° C. and in case of storage at -1° to 2° C., at least 40 percent, i.e., a 5-day prolongation in storage life.
- A Study of the Fauna of the Brown Shrimp (PENA-EUS AZTECUS Ives) Grounds in the Western Gulf of Mexico, by Henry H. Hildebrand, 366 pp., printed. Publ. of the Institute of Marine Science, vol. 3, no. 2, November 1954. Between October 20, 1950, and August 8, 1951, the bottom fauna on the shrimp beds in the western Gulf of Mexico were studied, as sampled by the trawls of the shrimping fleet. Specimens were identified and counted at sea and some were brought ashore for further study. The four major grounds for the brown shrimp and the pink shrimp grounds in the Gulf of Campeche are for the first time delineated and described. The faunal complex or bottom communities on brown shrimp beds are described and have been given community designations in terms of the most abundant animals caught. Additionally, the comparative or relative abundance of all species of fishes and invertebrates on each ground is more extensively discussed and compared with the inshore fauna. Each species taken is discussed individually and various natural history notes, including bathymetric distribution, are given. Data were gathered on quantitative distribution of white and brown shrimp by number and pounds per acre of bottom trawled. It is clear that the brown shrimp do not "school" extensively while the white shrimp do. The range for brown shrimp was 7.3 to 1.1 pounds per acre while the greatest range for white shrimp during a poor season was 5.4 to 1.6 pounds per acre. A breakdown of the number of species caught shows that the greatest numbers were taken at depths of 12 to 25 fathoms rather than at depths of 0 to 12 fathoms.
- Survey of the Littoral Zone of York County, Maine, with Respect to Commercial Productivity, by Louis N. Taxiarchis, General Bulletin No. 2, 13 pp., illus., printed. Department of Sea and Shore Fisheries, Augusta, Maine, 1953.
- Technical Report of Fishing Boat, No. 8, 182 pp., illus., printed in Japanese with brief English abstracts. Fishing Boat Laboratory, Production Division, Fisheries Agency, Ministry of Agriculture and Forestry, Kasumigaseki, Chiyodaku, Tokyo, Japan, March 1956. Contains the following reports, with very brief abstracts in English, on various studies in progress at the Fishing Boat Laboratory: (1) "Experiment of Controllable Pitch Propeller of the 'Soyo Maru';" (2) "Experimental Results of Model Tests for Wooden Two-boat Trawler; (3) "Study on the Automatic Net Depth Meter, Automatic Net Length Meter for Salmon Gill Net and the Results of Measurement at Sea;" (4) "Study on the Automatic Net Depth Meter, Net Height Meter for the Crab Tangle Net and its Practical Application;" (5) "Propagation Characteristics of High Frequency Ultrasound

in Sea Water (Continued);" (6) "Study on Reflection Loss of Ultrasonic Wave on Fish-Body by Millfmeter Wave;" (7) "Study on Simplified SONAR of 200 kc Ultrasound and its Field Test; (8) "Experiment of Fish-Finding at Fishing-Ground of Salmon in the North Pacific Ocean;" and (9) "Study on Application of Echo-Sounder for Fishing-Ground of Crab at the Okhotsk Sea, Western Waters of Kamtchatka Peninsula." An appendix lists the reports published in the past, Nos. 1-7.

Trolling Gear in California, by W. L. Scofield,
Fish Bulletin No. 103, 45 pp., illus., printed.
Department of Fish and Game, 926 Jay St.,
Sacramento 14, Calif., 1956. An account of
the trolling gear and methods of fishing off the coast of California. Trolling may be conducted from a small boat thereby requiring a low original investment and the gear used is relatively inexpensive compared with netting operations. As a result, this manner of fishing has attracted hundreds of commercial fishermen along the 1,000 miles of California coast. In recent years, commercial men are being outnumbered by the host of sport fishermen, many of whom do trolling at some time during the year. Sport fishermen pioneered ocean trolling in California and have initiated several of the improvements that have been adopted during the 75 years since ocean trolling started in this State. An account, from time to time, of the gear and methods of operating is desirable for each of the important fisheries. Not only may changes be noted, but gear and methods of fishing have a direct bearing when appraising the records of catch

per unit of fishing effort in attempts to determine changes in the supply of fish in the ocean. Definitions and descriptions of the various types of gear, histories of salmon and albacore trolling in California, and methods of fishing are among some of the subjects presented.

(Washington) <u>State of Washington Commercial Fishing Statistics</u>, 1955, 47 pp., printed. Washington State Department of Fisheries, Fishermen's Terminal, Seattle 99, Wash. Consists almost entirely of tables showing landings of fish and shellfish in the State of Washington by districts, species, and gear. Comparative data on the catch of most items are shown for the years 1935 through 1955. The report also contains information on the value of landings. Data are shown on the Washington salmon pack from 1900 to 1955, as is information on the United States and British Columbia Fraser River sockeye pack arranged by cycle years from 1900 to 1955. Data on the canned pack of other fish and shellfish and the production of oil and meal are also shown. In addition, the report contains data on the monthly salmon escapement over Bonneville Dam during the years from 1938 to 1955; the number of commercial fishing licenses issued by districts from 1938 to 1955; and a comparative statement of receipts from licenses, taxes, fines, and other sources. Conversion of catch data to the IBM method of computing has resulted in the revision of many production figures published previously in the Commercial Statistics series. Corrections from 1935 to date are contained in the 1955 summary, and the tables in this edition supersede all material previously published.



. CORRECTION: On page 23 of the July 1956 issue of <u>Commercial Fisheries Review</u>, one of the authors for the article "New Techniques for Freezing and Storing North Atlantic Lobsters" shown as "Joseph W. Flavin" should have read: "Joseph W. Slavin, Refrigeration Engineer."

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* * * * * *

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STUDY OF HOUSEHOLD CONSUMER PREFERENCES FOR BREADED SHRIMP AND FISH STICKS

In the third (Fishery Leaflet 426) of a series of reports on household consumer preferences for breaded shrimp and fish sticks, the data from 1,797 questionnaires is summarized by income groups, household size, homemaker age groups, and occupation. The tabulated results from the questionnaires reveal the following facts concerning consumer preference

for breaded shrimp and fish sticks:



- Consumption of breaded shrimp is concentrated among middle and upper income groups.
- 2. The percentage of households serving breaded shrimp increases moderately in relation to household size.
- 3. Young housewives buybreaded shrimp much more often than older home makers. Consumption is higher among white collar occupations than among occupations requiring manual skills.
- 4. The predominant marketing problem for breaded shrimp is to get consumers to try them. Nine out of ten home makers trying breaded shrimp become satisfied customers.
- 5. The consumption of cooked fish sticks is related directly to family income status. Households serving cooked fish sticks during the past year ranged upward from 20 percent for families with less than \$2,000 income per year to 50 percent for families with incomes over \$10,000. The percentage of households serving fish sticks also increased in relation to household size up to families of five members.
- 6. Consumption of fish sticks is highest among homemakers under 25 years of age. There-after, there is a slightly downward trend for older age groups. Fish-stick consumption is somewhat higher among white-collar occupations than among occupations requiring manual skills.
- 7. Roughly 60 percent of all American households represents the possible limits of the untapped market for fish sticks. Something like 85 percent of all homemakers buying fish sticks are satisfied with them.
- 8. About one household in five uses breaded shrimp, either cooked or uncooked. Consumption does vary, however, by family-income status, age of the homemaker, household size, occupation of the breadwinner, and some other factors.
- 9. Nine out of tenhousewives buying breaded shrimp are satisfied with them. The dominant merchandising problem therefore is to get housewives to try breaded shrimp.
- 10. Most of the large group which had not tried these products gave "No particular reason" as the answer when asked "Why haven't you tried them?" Insofar as the minority gave specific objections, some indicated an aversion for shrimp and others were not familiar with the product or the product was not available in local shopping centers. Significantly, only a very small percentage of those who had not tried breaded shrimp thought them too expensive.
- 11. When used by homemakers, breaded shrimp does not directly replace other fishery products. For the most part respondents indicated little indirect competition with other fishery products.
- 12. Housewives are well satisfied with the present package labeling as far as description of contents is concerned, the manner in which to prepare the shrimp, and suggested recipes. Most housewives prefer medium-breaded shrimp if offered a choice of thin, medium, and heavy breading. They also prefer the largest size shrimp and packaged in layers separated with paper rather than bulk packaging. Housewives prefer light golden-colored cooked shrimp to darker-colored cooked shrimp.

Fishery Leaflet 426 (Household Consumer Preferences for Breaded Shrimp and Breaded Fish Sticks, Part 3 - Summary by Income Groups, Household Size, Homemaker Age Groups, and Occupation) may be obtained free by writing to the Division of Information, U. S. Fish and Wildlife Service, Washington 25, D. C.

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SEPTEMBER 1956

FISH and WILDLIFE SERVICE United States Department of the Interior Washington, D.C.



COMMERCIAL FISHERIES REVIEW



A review of developments and news of the fishery industries prepared in the BRANCH OF COMMERCIAL FISHERIES

A. W. Anderson, Editor

J. Pileggi, Associate Editor H. M. Bearse, Assistant Editor

Mailed free to members of the fishery and allied industries. Address correspondence and requests to the: Director, Fish and Wildlife Service, U.S. Department of the Interior, Washington 25, D.C.

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The printing of this publication has been approved by the Director of the Bureau of the Budget, August 2, 1955.

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COVER: "Join the Fish Parade" emblem portrays the theme of National Fish Week, October 29-November 3, 1956, An all-industry consumer and trade publicity campaign is scheduled to run in newspapers, magazines, radio, television, and grocery and restaurant publications. A number of national associations and chain and independent retail organizations are advising their members how they can cash in on the promotion. Allied industries such as the Rice Industry will feature "Fish Parade" in their own publicity and advertising. The U, S, Fish and Wildlife Service will notify all food and trade associations of the program, and a press release was issued on September 19 by the Secretary of the Interior announcing support of the program. The U, S, Department of Agriculture will list the program as a Merchandising Opportunity in the tie-in material that goes to the "Plentiful Foods List." (See outside back cover of this issue.)

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DEVELOPMENT OF THE PACIFIC COAST OCEAN SHRIMP FISHERY

By James L. Squire, Jr. *

BACKGROUND

The Pacific Coast as a commercial shrimp-producing area is historically one of the oldest in the United States--shrimp fishing began about 1869. This early fishery, which started in San Francisco Bay, has continued through the years for a species of shrimp (Crago franciscorum) commonly known as "San Francisco Bay shrimp." The San Francisco Bay

fishery today yields an annual catch of about 900,000 pounds. The inside waters of Puget Sound have in the past also yielded considerable quantities of shrimp. These two areas have been the major shrimp producers on the West Coast of the United States.

But it was not until 1952 that the ocean shrimp off the Pacific Coast were first commercially fished. On April 28, 1952, the first trip of deep-water ocean shrimp (Pandalus jordani) was landed by the trawler Grace H at the port of Morro Bay, Calif. From this modest beginning is developing a commercial fishery of economic importance to the



Fig, 1 - The commercial ocean shrimp (Pandalus Jordani) in the foreground and a large $(8\frac{1}{2})^n$) spot prawn (P. platycerous), a species that is taken occasionally during commercial trawling for ocean shrimp.

Pacific Coast fishing industry. Exploratory fishing by state and Federal government agencies have laid the groundwork for the development of this growing fishery.

EXPLORATORY FISHING

In 1950 to 1953 exploratory fishing by the California Department of Fish and Game research vessel \underline{N} . \underline{B} . Scofield resulted in charting six areas having dense concentrations of ocean shrimp off the California coast. The areas where the ocean shrimp are found in commercial concentrations are from 40 to 90 fathoms in depth on green mud bottom. The concentrations off the northern portion of California were thought to extend possibly as far as Cape Blanco, Ore.

Subsequent activity by the commercial shrimp trawlers operating out of Crescent City, Calif., has developed the area off the extreme south end of Oregon and excellent catches have been reported from this area.

*Assistant Chief, Exploratory Fishing & Gear Development Section, Branch of Commercial Fisheries, U. S. Fish and

Wildlife Service, Washington, D. C.

During 1952 exploratory ocean shrimp fishing was conducted by the Oregon Fish Commission, using the chartered trawler Nel Ron Dic. Promising indications of

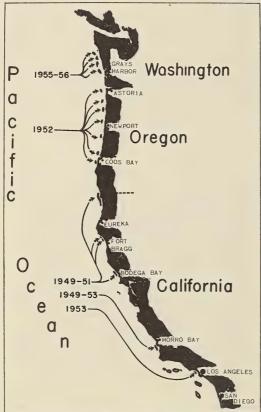


Fig. 2 - Map of exploratory fishing results.

shrimp were obtained in areas off Coos Bay, Cape Lookout, and Tillamook Head, Ore. Regulatory measures concerning the future fishery were issued in 1952 by the Oregon Fish Commission and the first commercial ocean shrimp fishing off Oregon began in 1953.

Exploratory fishing conducted off the coast of Washington by the Service's exploratory fishing vessel John N. Cobb, in cooperation with the State of Washington in late 1955, revealed shrimp over a widespread area off the Washington coast. Indications for a possible successful commercial fishery for ocean shrimp off the coast of Washington during the summer months, which are more favorable to the production of shrimp, was corroborated by this information. Additional exploratory work by the John N. Cobb in April 1956 again produced good catches. During a short period of "production trawling." catches averaged better than 1,400 pounds (heads on) for an hour of trawling, using a 40foot Gulf of Mexico flat trawl, indicating that during this more favorable time of the year commercial-scale production is possible. The catches made with the flat trawl, which, unlike Pacific Coast fish trawls, is without extended wings and is tied close up to the doors, included relatively few fish. The catch composition appeared to be about the same in flat-trawl and beam-

trawl hauls when working on known shrimp grounds, but the flat-trawl catches were larger. The producing areas as developed to date are all offshore in the sense of being outside the international three-mile limit.

COMMERCIAL OCEAN FISHERY

In 1952 the first season of ocean shrimp fishing off California saw a total catch landed in California of over 198,000 pounds. Landings at Morro Bay, Calif., accounted for the bulk of the landings with small amounts landed at the ports of Bodega Bay and Eureka in Northern California. Little interest in ocean shrimp fishing and processing was exhibited in Northern California in 1952, but this area during the 1955 season was the largest producing area in the State.

Two vessels fished for shrimp off Morro Bay, Calif., in 1952. Considering the type of gear used (16-foot and 18-foot beam trawls), the catch for an hour of trawling



Fig. 3 - Shrimp trawler at Morro Bay, Calif., showing beam trawl and "A" frame which is used for towing and handling the beam.



Fig. 4 - Setting the 18-foot beam trawl.

was very high, averaging close to 700 pounds of shrimp for every hour of trawling. Occasional catches of as high as 4,000 pounds an hour were recorded in this area. The ex-vessel price to the fisherman was 10 cents a pound (heads on), and a normal day's catch would run 1,000 to 3,000 pounds.



Fig. 5 - Hauling up the trawl after $a\frac{1}{2}$ -hour tow.



Fig. 6 - Beam trawl secured to the "A" frame with a bag of shrimp breaking water in the foreground.

The 1953 ocean shrimp catch for the States of California and Oregon was approximately 240,000 pounds. California with landings of 205,000 pounds accounted for most of the total catch, with increased landings in the Northern California area. However, as in 1952, the great percentage of the California ocean shrimp catch was made in the area off Morro Bay by the same vessels that fished in 1952. The catch for an hour's trawling decreased from the 1952 average high of 700 pounds an hour to about 540 pounds an hour in this southern area.

In Oregon, the first commercial catch of ocean shrimp was made in June 1953 by the trawler <u>Nel Ron Dic</u>. The catch was landed and processed at Coos Bay, Ore.

During the 1953 season 25,000 pounds of ocean shrimp were landed, with the majority caught in the vicinity of Cape Lookout, Ore., to Cape Elizabeth, Wash., and

processed at Garibaldi, Ore. Only a small amount of shrimp was landed and processed at Coos Bay, Ore., during the 1953 season.

In 1954 increased interest by Northern California processors and fishermen resulted in an increase in the total landings of ocean shrimp to about 305,000 pounds. Since the best available records indicate the Oregon fishery did not produce any ocean shrimp during 1954, the total West Coast catch (excluding Alaska and British Columbia) can, therefore, be credited to fishing off the California shore. The majority of the catch in California was landed at the ports of Bodega Bay and Crescent City, with each



Fig. 7 - Net and bag of shrimp being landed on the port side.

port sharing about equally in the total catch. The shrimp grounds off Morro Bay, which previously had supported the State's major production, failed to produce shrimp in commercial quantities in 1954. Numerous attempts were made by local shrimp



Fig. 8 - Shrimp bag coming over the rail.



Fig. 9 - Pulling the cod-end rope to release the $\frac{1}{2}$ -hour's catch of 700 pounds of ocean shrimp.

trawlers to locate profitable production areas, without success, and as a result production from off Morro Bay was only 5 percent of the 1953 catch. Three trawlers



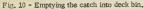




Fig. 11 - Sorting out unwanted material and stowing in small boxes (35 to 50 pounds per box) to prevent crushing.

produced the majority of the California catch in 1954 and these trawlers plus two additional vessels continued their operations again during the 1955 season.

Record production during 1955 was the reason the total ocean shrimp catch more than doubled that of 1954. The Pacific Coast landings of deep-water ocean shrimp totaled 722,363 pounds in 1955. California

shrimp totaled 722,363 pounds in 1955. California accounted for 716,976 pounds, with 382,777 pounds of this total landed at Crescent City and 332,753 pounds at Bodega Bay. For the second year the shrimp area offshore from Morro Bay produced only a token amount of shrimp after repeated fishing efforts.

Oregon production in 1955 was 5,387 pounds, with the major portion of the catch made off Newport, Ore., in the area bounded by Hecate Bank and Cape Lookout.

STATE REGULATIONS

CALIFORNIA: The State of California enacted in 1951 legislation prescribing certain regulations for the ocean shrimp fishery as a result of information gained on the possible magnitude of the resource by exploratory fishing results. The State waters were divided into three areas, each with a precified pounds growth limit.



Fig. 12 - Unloading a portion of the day's catch at Morro Bay, Calif. Shrimp is landed raw heads on.

specified poundage quota limit. Total production possible under the original regulation was 2.5 million pounds (heads on) a season. In 1956 the area from Point Conception to Pigeon Point (below San Francisco) was made an illegal area for shrimp trawlers. In this area lies the original producing fishery (off Morro Bay, Calif.) which after two years of very low production was ordered closed by the State Fish and Game Commission. The total production now legally possible during a season is 1.6 million pounds (heads on) as a result of reduced fishing areas and quotas.

Gear restrictions enacted in 1952 specified the use of beam trawls, with a maximum width of 20 feet, and a net mouth circumference of not over 45 feet. The original minimum mesh regulation of $1\frac{1}{8}$ inches was increased to $1\frac{1}{2}$ inches for the cod end in 1956; in 1957 all meshes are required to be $1\frac{1}{2}$ inches.

The limiting of the gear to beam trawls is an attempt by the State conservation agency to lessen the effect small mesh nets may have on the existing flatfish trawl

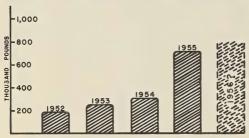


Fig. 13 - West Coast ocean shrimp production, 1952-1955.

fishery. Beam trawls are claimed to be less efficient in the capture of finfish when compared to otter trawls. If large otter trawls of small mesh were allowed this would work to the detriment of the otter-trawl bottom fishery, which operates in the same area and is presently limited to a mesh size of not less than $4\frac{1}{2}$ inches.

A season was established extending from April 1 to September 30 or until the poundage quota was caught. In 1954 the season was adjusted to May 1 to October

15 to correspond more closely to the period of the year when the shrimp are not carrying fertile eggs.

OREGON: The only regulation affecting ocean shrimp fishing off the State of Oregon is that shrimp fishing shall be with beam trawls. The size of the beam or net mesh are not specified nor are season or poundage regulations invoked.

<u>WASHINGTON</u>: Ocean shrimp may be taken by beam trawls and otter trawls. The size of the gear is not restricted except that the mesh of shrimp nets shall not be less than $1\frac{1}{2}$ inches. The State of Washington specifies that shrimp trawlers shall be equipped with a sorting device to return the unmarketable undersize shrimp to the water as soon after capture as possible. Season, poundage, or area restrictions for the ocean shrimp fishery are not specified.

OUTLOOK

Factors that will determine how rapidly and to what size this fishery will develop are many. Because economically processing these small shrimp is a problem, many fish dealers are reluctant to enter the field of ocean-shrimp processing. The cost of labor for picking the small shrimp results in a high production cost which is reflected in a high wholesale price. However, the quality of the frozen vacuum-packed cooked-and-peeled "cocktail size" product is such that it has been able to meet competition from other domestic and foreign sources. The total quantity of shrimp available to the commercial fishery is unknown in many cases, and as a result the total seasonal production potential cannot be predicted at the present time.

The Pacific Coast ocean shrimp fishery developed as the result of extensive exploratory fishing activities in the various areas. These explorations and the efforts of commercial fishermen and processors have developed a marine resource that is providing added income for the Pacific Coast fishing industry.



NEW PRODUCTS FROM FISH OILS

Part II - Polyamino Fatty Acids Derived from Fish Oils

By R. N. McDonald* and Edward H. Gruger, Jr. **

ABSTRACT

The work reported in this paper is directed toward finding new uses for fish oils and consists in studying the chemical derivatives of their constituent fatty acids. Among these derivatives are the polyamino fatty acids, which should have excellent surface-active properties, owing to their highly polar and polyfunctional character. They therefore may find use as fungicides, corrosion inhibitors, detergents, and ore-flotation agents,

In the preparation of the polyamino fatty acids, amination of the double bonds in unsaturated fatty acids and esters was attempted by three methods.

The first method involved the conversion of polyhalo acids to polyamino acids by the reaction with liquid ammonia. Initial work done on the various haloacids prepared from the reaction of purified oleic acid with hydrobromic acid, with hydriodic acid, and with bromine,

The second method involved (1) the reaction of tetranitromethane with the double bonds and (2) the subsequent reduction of the nitro groups. Only the reaction between tetranitromethane and oleic acid and their reaction products were investigated in this phase of the program,

The third method involved the alkylation of potassium phthalimide with the addition products of hydriodic acid and of bromine to methyl oleate in an attempt to provide an intermediate for the synthesis of polyamino fatty esters. The hydrolysis of the phthalimido groups on these compounds to produce amines will be the subject of further study,

INTRODUCTION

Fish oils contain components that are unique in chemical structure and that are not common in animal or vegetable oils. These components possess an unusually

high degree of unsaturation: that is, they contain a large number of carbon to carbon double bonds. Relatively little work has been done on the investigation of derivatives of fish oils, owing to the difficulty in separating the pure compounds from complex mixtures in the oils and to the instability of the unsaturated compounds when in contact with air.

WORK AT SEATTLE LABO-RATORY: The work at the Seattle Technological Laboratory has been directed toward finding new uses for fish oils. The investigation of chemical derivatives of the constituent fatty acids in fish oil has been the major project. The importance of this work has been described by Stansby (1956). In this investigation, the type of derivative chosen is such as to take advantage of the u-



Fig. 1 - Methanol-urea countercurrent distribution of urea inclusion compounds of long-chain fatty substances.

nique character of unsaturation. * Part-Time Organic Chemist (graduate student

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Note: "Part I - Introduction" appeared in Commercial Fisheries Review, August 1956, p. 1.

Polyamino fatty acids $\frac{1}{}$ are a class of derivatives that may be prepared by utilizing the unsaturated portion of fish-oil fatty acids. Polyamino fatty acids have potentialities as copolymers, as complexing agents, as sequestering agents, and as fungicides, corrosion inhibitors, detergents, ore-flotation agents, and other surface-active agents. Their preparation, in essence, involves the addition of ammonia to the double bonds.

LITERATURE RESEARCH: The scientific literature shows that very little work has been done on the lower homologs (C2 to C8) regarding amination of the double bonds and that no work has been done on the higher homologs. The patent literature reports a considerable number of processes for the amination of olefins, using high pressure, high temperature, and usually a catalyst of reduced cobalt or nickel oxide (Teter 1947, Teter and Olson 1950). This high-pressure catalytic amination with ammonia has been carried out with several of the olefins of lower molecular weight (C2 to C6). The yields per pass of material over the catalyst is poor (10 to 15 percent). Thus recycling of materials is required to increase the yields.

Groggins (1952) has listed several aminating reagents and amination reactions. The aminating reagents listed are (1) liquid ammonia, (2) aqueous ammonia, and (3) ammonia in an inert solvent. Aqueous ammonia almost always produces secondary and tertiary amines. A problem that arises in the use of ammonia is to find an inert solvent that will readily dissolve both the ammonia and the compound to be aminated and that will be easily removable. The amination reactions listed by Groggins are (1) the conversion of halogen compounds, (2) the replacement of sulfonate or sulfate groups, (3) the conversion of alcohols, and (4) the reaction of ammonia with hydrocarbons.

Julius v. Braum and co-workers (1937) have discussed the advantages of liquid ammonia over aqueous or alcoholic solutions for use in the preparation of primary amines from organic halogen compounds. In general, the action of aqueous or alcoholic ammoia on organic halogen compounds is not well adapted to the preparation of primary amines because secondary and tertiary amines and some quaternary ammonium halides are formed. The use of liquid ammonia should favor the formation of primary amines.

Harwood (1952) has given a good review of the syntheses of amines.

DISCUSSION OF EXPERIMENTS

AMINATION WITH LIQUID AMMONIA: The work at the Seattle laboratory began with the attempt to convert long-chain polyhalo fatty acids, which had been prepared from the unsaturated fatty acids of fish oils, to polyamino acids by amination with liquid ammonia. The initial work was carried out on purified oleic acid in order to avoid the complications that arise from the complex mixture found in fish oil and to simplify the investigation of the reaction and of the products. Three types of haloacids were prepared from oleic acid by the addition of hydrobromic acid, of hydriodic acid, and of bromine to the double bond. These reactions can be represented by equations 1 and 2, where the reaction of hydriodic acid is the same as that of hydrobromic acid:

1/For example, the formulae of some polyamino fatty acids may be as follows:

(a)
$$CH_3$$
 CH_2 $CH_$

$$\begin{array}{c} \text{CH}_{3}\text{--}(\text{CH}_{2})_{7}\text{--}\text{CH} = \text{CH}\text{--}(\text{CH}_{2})_{7}\text{--}\text{COOH} + \text{Br}_{2} \xrightarrow{} \\ \text{CH}_{3}\text{--}(\text{CH}_{2})_{7}\text{--}\text{CH}\text{--}(\text{CH}_{2})_{7}\text{--}\text{COOH} \\ \\ \text{Br} & \text{Br} \end{array}$$

The reaction of these haloacids with ammonia was complicated by the fact that they solidified at the temperature of liquid ammonia. In the purification of the reaction products, every attempt to crystallize the long-chain amino acids (or diamino acids) failed. Work was therefore directed toward finding a method of synthesis that would be more successful.

AMINATION BY REDUCTION OF NITRO GROUPS: Another method that was attempted for the synthesis of polyamino acids involved (1) the reaction of tetranitromethane with the unsaturated fatty acids and (2) subsequent reduction of the transferred nitro groups attached to the long-chain acids. Whitmore (1951) has shown that, in methyl alcohol, tetranitromethane adds to double bonds. With oleic acid this reaction can be expressed according to equation 3.

$$\begin{array}{c} \text{CH}_{3} - (\text{CH}_{2})_{7} - \text{CH} = \text{CH} - (\text{CH}_{2})_{7} - \text{COOH} + \text{CH}_{3} \text{OH} + \text{C(NO}_{2})_{4} - \\ \\ \text{NO}_{2} \\ \text{CH}_{3} - (\text{CH}_{2})_{7} - \text{CH} - \text{CH} - (\text{CH}_{2})_{7} - \text{COOH} + \text{CH(NO}_{2})_{3} \\ \\ \text{OCH}_{3} \end{array} \tag{3}$$

The reduction of the nitro groups is represented by equation 4.

$$\begin{array}{c} \text{NO}_2 \\ \text{CH}_3 - (\text{CH}_2)_7 - \text{CH} - (\text{CH}_2)_7 - \text{COOH} \xrightarrow{\text{Sn}} \text{CH}_3 - (\text{CH}_2)_7 - \text{CH} - (\text{CH}_2)_7 - \text{COOH} \end{array} \tag{4}$$

Neutralization equivalents were used to check whether or not the reaction proceeded with oleic acid. Various solvents were studied to determine which one was conducive to a reaction that would give a good yield of the desired product. In all but one of the solvents studied, the products were oils and would not crystallize.

In a reaction of tetranitromethane with methyl oleate, the one exceptional solvent (dry pyridine--absolute ethanol in 2.5:1.0 ratio) produced a crystalline product melting at 72° to 74° C. With this reaction, however, the product decomposed on standing at room temperature. The supernatant liquid from the crystallization produced an oil that could not be crystallized. Separation by a five-stage methanolurea countercurrent distribution (figure 1) of an ether-extracted portion of the oily product gave five fractions, of which the first three had iodine numbers ranging from 44 to 65 and of which the last two had iodine numbers of 0.

A tin and hydrogen chloride reduction of the crystalline product was carried out, and the reaction product was isolated. This product has not as yet been identified. Analysis of the infrared spectra will show whether or not the reaction has produced an amino acid ester.

Similarly, infrared analysis of the crystals of the expected nitro compound will show whether or not nitration has occurred. These analyses have been postponed until the use of an infrared spectrophotometer can be obtained.

Owing to the oily character of the products, to the apparent difficulty in obtaining the products as crystals, and to the instability of the polynitro compounds, another method was sought for the synthesis of the polynmino fatty acids.

AMINATION BY ALKYLATION OF POTASSIUM PHTHALIMIDE: The Gabriel synthesis was thus the next reaction tried for preparing polyamino fatty acids. This reaction involves two steps: (1) the conversion of alkyl halides to alkyl phthalimides and (2) the hydrolysis of the alkyl phthalimides to alkylamines.

The conversion of methyl oleate, by means of the Gabriel synthesis, can be represented by the following equations:

$$\begin{array}{c} \text{CH}_3\text{--}(\text{CH}_2)_7\text{--}\text{CH}\text{--}(\text{CH}_2)_7\text{--}\text{COOCH}_3\xrightarrow{\text{HX}}\text{CH}_3\text{--}(\text{CH}_2)_7\xrightarrow{\text{CH}\text{--}(\text{CH}_2)}_8\text{---}\\ \text{COOCH}_3+\text{CH}_3\text{--}(\text{CH}_2)_8\xrightarrow{\text{CH}\text{---}(\text{CH}_2)}_7\text{---}\text{COOCH}_3 \end{array} \tag{5}$$

$$CH_3$$
— CH_2)7— CH — $(CH_2)_8$ — $COOCH_3$ — CH_3 — $(CH_2)_7$ — CH — $(CH_2)_8$ — $COOCH_3$ (6)

Again, as stated earlier, a pure compound had to be used as the starting material for the preliminary study of the reaction. Methyl oleate was used to prepare methyl 9, 10-dibromooctadecanoate. The latter compound was purified by carrying out a six-stage methanol-urea countercurrent distribution. This step was followed by a chromatographic separation, using an alumina-packed column. A white crystalline product was obtained, which was then reacted with potassium phthalimide. The product obtained in turn from this reaction was a gray-brown crystalline solid, characteristic of alkyl phthalimides.

A similar reaction of potassium phthalimide and methyl 10-iodooctadecanoate was carried out, producing characteristic gray-brown crystals. Consequently, further study of the products is necessary.

CONCLUSIONS

- (1) The conversion of polyhalo fatty acids or esters by their reaction in liquid ammonia does not appear to be a suitable method for preparing polyamino fatty acids. This method may be made successful, however, provided a suitable mutual solvent can be found that will prevent the precipitation of reactants at the temperature of liquid ammonia and provided that steric effects in the molecules will prohibit the formation of secondary-amino acids.
- (2) The method of preparing polyamino fatty acids by reducing nitro groups and utilizing the reaction of tetranitromethane may be a feasible solution to the problem if oily products are satisfactory. Owing to the long-chain character of the mole-

cules of these products, oils are to be expected. Also, the increased polarity of molecules containing polyfunctional groups will tend to produce oils. To identify the reaction products and to determine if the conversion is successful, however, crystalline products are desired.

(3) The Gabriel synthesis may possibly be the most successful solution to the problem of preparing polyamino fatty acids. Its value, however, has not yet been fully determined.

LITERATURE CITED

v. Braun, J.; Lotz, R.; Warne, K. C.; Pinkernelle, W.; Rohland, W.; Pohl, A.; Dengel, F.; and Arnold, H.
1937. Action of Liquid Ammonia on Organic Halogen Compounds. Berichte, vol. 70B, pp. 979-993.

Groggins, P. H.

1952. Amination by Ammonolysis. Unit Processes in Organic Synthesis, McGraw-Hill Book Company, New York, N, Y., pp. 340-414.

Harwood, H. J.

1952. Derivatives of the Fatty Acids. Progress in the Chemistry of Fats and Other Lipids, edited by R. T. Holman, W. O. Lundberg, and T. Malkin, Academic Press, Inc., Publishers, New York, N. Y., vol. 1, pp. 136-153.

Stansby, M. E.

1956. New Products from Fish Oils. Part I - Introduction. Commercial Fisheries Review, vol. 18, no 8, pp. 1-3.
(Also Separate No. 444).

Teter, J. W.

1947. U. S. Patent 2,419,470, April 22.

, and Olson, L. E.

1950. U. S. Patent 2,520,181, August 29.

Whitmore, F. C.

1951. Organic Chemistry, D. Van Nostrand Company, Inc., New York, N. Y., 2nd edition, p. 163.



JAPAN LEADING PRODUCER OF FISHERY PRODUCTS

Statistics of the Food and Agriculture Organization of the United Nations show that Japan is the leading producer of fishery products, as it has been for many years. The Japanese produce approximately 17 percent of the world catch, followed by China, Russia, and the United States (which produces about 9 percent of the world catch).

It has been estimated that almost 50 percent of the world catch of fishery products was made by Asiatic countries, while somewhat over one-fourth was taken by European countries. North American countries account for about 13 percent of the total, and African countries about 6 percent.

--<u>Sea Secrets</u>, The Marine Laboratory, University of Miami, Coral Gables, Fla.



"TENTATIVE" METHOD FOR DETERMINING COATING CONTENT OF FROZEN FRIED FISH STICKS

The voluntary United States standards for grades of frozen fried fish sticks (Federal Register, July 21, 1956) provide that "frozen fried fish sticks contain not less than 60 percent, by weight, of fish meat." In order to determine compliance with this requirement for officially-graded products, work was carried out at the



Fish sticks coming off a conveyor belt system after they have been breaded.

Service's Technological Laboratory at East Boston, Mass. A physical method has been developed which permits rapid analysis. Considerable interest in the method has been expressed by members of the fish-stick industry in the New England area. Several demonstrations to local industry groups have been carried out. At present commercial lot samples are being analyzed to check the lot-sampling rates.

The method of analysis is simple and requires only a comparatively short time. It consists of

the following: (1) weigh whole frozen stick, (2) dip stick in a colored solution at room temperature for a specified time, (3) remove coating by scraping with a spatula, (4) weigh remaining fish meat, and (5) calculate percentage of fish meat content by the formula:

(weight of fish meat after removing coating) X (100)
(weight of whole frozen fried fish sticks)

In order to obtain accurate results, various specific procedures must be followed and certain precautions must be exercised. A complete report on the procedure will be issued at a later date. In the meantime, however, it is possible that producers of fish sticks may be interested in the method of analysis as a quality-control tool. A limited supply of a "nonofficial" draft of the procedure has been prepared and copies are available from the Fishery Technological Laboratory, U. S. Fish and Wildlife Service, 61 Sumner Street, East Boston, Mass.



FEDERAL SPECIFICATION FOR CHILLED AND FROZEN CRABMEAT

The Federal Specification for Crab Meat, Cooked; Chilled and Frozen, PP-C-656a, was issued March 6, 1956. This specification supersedes Interim Federal Specification PP-C-00656a, May 2, 1955 and the original Federal Specification PP-C-656, March 31, 1931.

The new specification was developed by the Technological Section of the U.S. Fish and Wildlife Service and the Quartermaster Food and Container Institute for the Armed Forces. It was approved by the Commissioner, Federal Supply Service, General Services Administration, for use of all Federal agencies. The new requirements reflect modern methods and improvements in preparation and packaging of fresh and frozen crab meat. Three species of crab are specified: blue, dungeness, and king.

Federal fish specifications are prepared by the U. S. Fish and Wildlife Service as needed to meet the requirements of two or more Federal agencies for the government purchase of fishery food items. They are in general use throughout the government agencies. A Federal fish specification is a definite, accurate, and complete statement of the requirements for a particular fishery product and of the procedures to be followed in determining compliance with these requirements. They are issued by the Federal Supply Service, General Services Administration, and are designed to cover existing commercial products. A specification is issued only after complete review by the various Government agencies and the fishery industries. (See Commercial Fisheries Review, vol. 14, no. 5, pp. 14-16, May 1952; vol. 17, no. 8, pp. 9-10, August 1955.)



PROSPECTS OF UTILIZING LITHIUM SALTS OF FATTY ACIDS FROM FISH OILS IN LUBRICATING GREASES

A possibly large field for use of fish oils appears to exist in the newly-developed, high-temperature, lithium salts lubrication greases. A review of the literature in <u>Chemical Abstracts</u> for the years 1952, 1953, and 1954 has indicated 23 separate articles and patents on lithium salts in greases. No attempt was made to go further into the literature for it seemed that the work reported in recent years would give a good indication of the progress and development being made in an apparently new field of lubricating greases.

A review of five United States patents on greases containing lithium salts indicated that the subject is well covered. Of these patents, two were found to include the use of hydrogenated-fatty acids from fish oils. No information was found regarding the use of the natural unsaturated fatty acids in these greases.

The types of lithium fatty acid salts that are most often used are stearates, hydroxystearates, and hydrogenated fatty acid salts such as those produced from hydrogenated fish oils or tallow. The lithium fatty acid salts are reportedly used in concentrations of as little as 4.5 percent to as much as 35 percent of the total grease composition, depending on the desired properties of the lubricant.

The lithium salts reportedly used and included in the patent were prepared from fatty acids containing from 12 to 24 carbon atoms per molecule. Salts prepared from fish-oil fatty acids possess an average carbon-chain length greater than those prepared from animal or vegetable oils. If, as seems to be the case, this unique characteristic imparts improved properties to the greases, then fish oils are a logical choice for this purpose.

On the basis of utilizing saturated fatty acids, hydrogenated fish oils should be a better choice than oils from animal or vegetable sources from the cost standpoint. It is suggested that lithium salts of hydrogenated fish-oil fatty acids be promoted for use in high temperature lubricating greases. Their prospects for this application should be very good.



California

CRAB TRAP SAVINGS-GEAR STUDIES BY M/V "NAUTILUS" (Cruise 56-N-1): To conduct savings-gear studies using different size escape openings on crab traps



M/V Nautilus Crab Cruise 56-1 (May 15-26, 1956).

and to obtain samples of small crabs by beam trawling were the primary objectives of the California Department of Fish and Game cruise with the M/V Nautilus from May 15 to May 26.

A total of 24 commercialsize crab traps were fished off Central California in the Bodega Bay area; 8 were equipped with two 4_1^{4} " circular escape openings each, 8 with two 4" circular openings each, and 8 with no provision for escapement. The traps were alternately set in one line, i.e. no escape, 4", 4_1^{4} ", no escape,

etc. They were spaced about 200 feet apart and covered a distance of approximately one mile. Depths fished were from 42 to 46 feet.

An 8-foot beam trawl with a 1" mesh net was used to catch small crabs.

<u>Savings-Gear Studies</u>: The traps were pulled and emptied every 2 days, and were set again in approximately the same place. Rockfish frames were used as bait. A total of 40 sets each were made with the noescape opening and 4"-escape-opening traps, and 39 sets with $4\frac{1}{4}$ " escapes. One of the $4\frac{1}{4}$ "-escape-opening traps was lost.

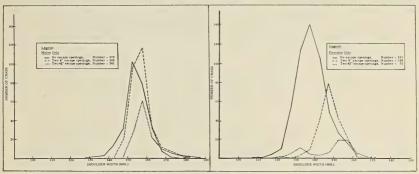
From a total of 119 trap sets, a total of 1,485 market crabs (<u>Cancer magister</u>) and 2 red crabs (<u>Cancer productus</u>) were caught. The following table is a summary of the catch for the type of escape opening used.

	MALE CRABS						FEMALE CRABS					
	No I	Escape 4"		4	4 ¹ / ₄ No E		Escape		4"	44"		
	Op	ening	Opening		Opening		Opening		Opening		Opening	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Legal (over 43")	42	15.4	55	19.2	42	32.0	28	5.4	37	18.6	38	50.6
Sublegal $(4\frac{1}{4}$ " to $4\frac{3}{4}$ ")	78	28.7	126	43.9	60	45.8	23	4.4	42	21.1	8	10.7
Sublegal (4" up to 41")	132	48.5	105	36.6	28	21.4	151	29.0	105	52.8	8	10.7
Sublegal (under 4")	20	7.4	1	. 3	1	. 8	319	61.2	15	7.5	21	28.0
Totals	272	100.0	287	100.0	131	100.0	521	100.0	199	100.0	75	100.0
1 1 1 1 1 1 1 1 1 1	1 Comment of the state of the s										r.ridth	

Males: $4\frac{1}{4}$ " to $4\frac{9}{8}$ " in length = 155 mm, to 159 mm, shoulder width,; 4" up to $4\frac{1}{4}$ " in length = 145 mm, to 154 mm, shoulder width. Females: $4\frac{1}{4}$ " to $4\frac{9}{8}$ " in length = 148 mm, to 152 mm, shoulder width.; 4" up to $4\frac{1}{4}$ " in length = 139 mm, to 147 mm, shoulder width. (The shoulder width is a caliper measurement just in front of the last antero-lateral spine,)

Width and weights of the total catch were taken on May 17. This catch included 100 males and 197 females.

Beam Trawling: A total of 8 drags were made with the beam trawl. These were usually of 15 to 20 minutes duration. Market crabs were taken in all drags and included several year-classes. As many as 500 crabs of an average shoulder width size of 12 mm. were taken in one tow; 174 crabs of an average shoulder width of 85



Width frequencies of market crab (Cancer magister) -- escape opening studies for traps (May 1956, Bodega Bay).

mm. were caught in another drag. The latter are believed to be from last year's hatching. Samples of megalops (crab larvae) were obtained the first day. These were sighted swimming on the surface of the water and were scooped up with a bucket. Efforts to keep them alive on board were not too successful. However, a few were held long enough to molt into the first crab stage.

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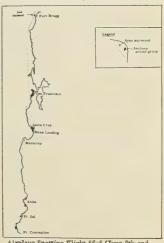
AIRPLANE FLIGHTS TO STUDY PELAGIC FISH DISTRIBUTION (Flight 56-5): The fifth of a series of periodic flights to study pelagic fish distribution, abundance, and

behavior in 1956 off the coast of California were conducted by the State's Department of Fish and Game. The inshore area between Fort Bragg and Monterey, and the offshore area around San Nicolas, Santa Catalina and Santa Cruz Islands was surveyed by Beechcraft 4758N (June 8 and June 11-13). The inshore area from Monterey to Pt. Baja, Baja California was surveyed by Cessna "170" 1359D.

As on previous flights this year anchovies dominated the inshore area over the entire extent of the coast covered, with jack mackerel and sardines occupying the offshore area.

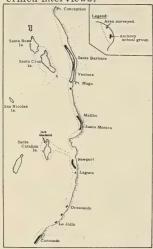
No euphausiid swarms were observed in the central California area as were found in April and May indicating that this swarming phenomenon is a seasonal behavior of the offshore shrimplike species <u>Euphausia pacifica</u>. Recent oceanographic studies conducted at Hopkins Marine Station have revealed the presence of such a phenomenon and the above aerial observations have confirmed the results of this more intensive study.

Commercial and live-bait fishing were active along the California coast in June, and



Airplane Spotting Flight 56-5 (June 8th and 15th, 1956).

identification of schools sighted in areas of fishing activity was confirmed by fishermen interviews.



Airplane Spotting Flight 56-5 (6/11-15/56).

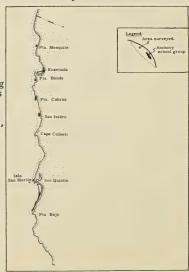
The total area of fish schools seen was determined by measuring the length and width of a sample of schools in each school group by means of a small prism scope containing a graduated reticle. The following is a summary of the observations of fish schools:

Anchovy: In central California (Pt. Reyes to Pt. Conception) anchovies increased in abundance since May, especially in the Monterey Bay and Avila areas. Monterey Bay fishermen could not obtain commercial-size anchovies in June as the fish taken were small "four-inch" anchovies, probably of the 1955-year class. Apparently the larger fish present in the bay for the past 1½ years have been replaced by a school group of younger fish. For the first time in over 6 years anchovies have been found in the area between Pt. Sal and Pt. Conception. This brings to light the possibility that the heretofore partially isolated group of anchovies frequenting the Avila area is an extension of the southern California-northern Baja California population.

Anchovies in southern California remained in approximately the same abundance as in May 1956, however there was a considerable change in distri-

bution of the school groups. The main concentration of anchovies in June was in the area between Goleta and Port Hueneme, whereas in May the main concentration was in the area between Pt. Vicente and Laguna.

In March 1956 no anchovies were observed in northern Baja California. In June, however, large school groups of anchovies were encountered almost continuously along the coast from the California-Mexico border to Pt. Baja. Commercial fishermen working out of San Quintin reported that the anchovies in that area were too small for commercial purposes. A similar situation existed along the Baja California coast during June of 1955, when young fish were found near San Quintin, and the older fish were found along the coast to the north and farther offshore. The following is a tally of the anchovy schools observed and total area (sq. ft.) of fish tallied in each 10-mile section in which fish were found: Central California -- 163 schools, 1,412,000 sq. ft.; Southern California-1,162 schools, 7,482,000 sq. ft.; N. Baja California--1,000 schools, 9,365,000 sq. ft. In addition to these schools, about 10 "breezing" schools were sighted offshore from Oceanside, but since these schools were too far out to observe closely with the small plane their identification was uncertain. In the same area in May a large number of young



Airplane Spotting Flight 56-5 (6/13-14/56).

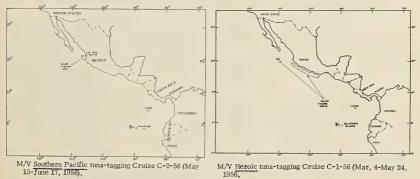
anchovy schools were sighted in this area and it is possible that these schools have moved farther offshore.

<u>Sardine and Mackerel</u>: Seven mixed jack mackerel and sardine schools were sighted off the east end of Santa Catalina Island. Commercial fishermen reported similar schools at San Clemente, Santa Rosa, and Santa Cruz islands. No pure schools of sardines were sighted during this flight. The pattern of distribution of sardine schools is comparable to that of June in 1955. Twelve schools of fish presumed to be jack mackerel were sighted near Fort Bragg on June 8th.

Other Species: Five schools of yellowtail (Seriola dorsalis) were sighted off La Jolla on June 11. These schools averaged around 60 feet in diameter and were very near the surface. On two occasions fish were observed leaping out of the water.

* * * * *

TWO TUNA-TAGGING CRUISES (M/V "HEROIC," CRUISE 56-C-1 AND M/V "SOUTHERN PACIFIC," CRUISE 56-C-2): Two commercial tuna clippers while on regular tuna-fishing trips were utilized by the California Department of Fish and Game to tag tuna off the west coast of Mexico. The purpose of the cruise was (1) to tag yellowfin and skipjack tuna with white tubular plastic tags, type G, with center protective covering removed; (2) to make collections of fish by live-bait fishing, from bait hauls, and under a light at night; (3) to carry on other phases of tuna studies incidental to main tagging work; and (4) to test tag retention in two different body positions; a new location under the second dorsal fin and under the first finlet, which is the usual position.



The tuna clipper Heroic (Cruise 56-C-1) sailed on March 4, 1956, and returned on May 4 to San Diego. The area of operations was off the Revilla Gigedo Islands and off the west coast of Mexico. During this cruise 140 yellowfin, 244 skipjack, and 3 black skipjack tuna were tagged, for a total of 387.

Also, during this cruise 36 night-light stations were occupied while drifting at night. Numerous specimens were taken during night and day bait hauls and fishing while anchored. Frozen specimens and 76 bottles of specimens were collected on this cruise.

The tuna clipper <u>Southern Pacific</u> (Cruise 56-C-2) sailed on May 15 and returned June 17 to San Diego. Area of operations was in the vicinity of the Las Tres

Marias Islands, Mexico. A total of 122 fish, 74 skipjack and 48 yellowfintuna, were tagged and released during the cruise. Porpoise schools were encountered and these areas fished extensively from May 23 to June 10. The fish in these schools were almost entirely two-pole yellowfin tuna; a size too large for practical tagging. Most of the tagging occurred on June 11 and 12, when schools of skipjack and one-pole yellowfin tuna were fished.

Specimens of larvae fish, small fish, and other marine organisms were taken on nine night-light stations, four bait-making stations, and from three hook-and-line stations.



Cans--Shipments for Fishery Products, January-May 1956



Total shipments of metal cans during January-May amounted to 43,555 short tons of steel (based on the amount of steel consumed in the manufacture of cans) as compared with 34,027 tons in January-May 1955. The increase in January-May 1956 over that for the same period in 1955 reflects the heavier pack of canned tuna as compared with the

January-May 1955 period, when production was curtailed due to oversupply. Many packers of canned fishery products make heavy purchases in April prior to the spring and summer packing season.

Note: Statistics cover all commercial and captive plants known to be producing metal cans. Reported in base boxes of steel consumed in the manufacture of cans, the data for fishery products are converted to tons of steel by using the factor: 23.0 base boxes of steel equal one short ton of steel,



Federal Purchases of Fishery Products

FRESH AND FROZEN FISHERY PRODUCTS PURCHASED BY THE DEPART-MENT OF DEFENSE, JUNE 1956: A total of 2,737,268 pounds (valued at \$1,234,608) of fresh and frozen fishery products for the use of the Army, Navy, Marine Corps, and Air Force were purchased in June 1956 by the Quartermaster Corps. This was an 0.8 percent increase in quantity, but the value declined 6.6 percent as compared with the previous mosth.

	of Fresh a tment of D Months of	efense	(June	and the	First	ts by
QUAN		1000 1	Ten Co.		LUE	
June	JanJ	une	Ju	ne	Jan	June
1956 1955	1956				1956	
(1,000					000) .	
2,737 2,289	12,231 1	3,114	1,235	988	6,090	5,628

with the previous month, Compared with June 1955, purchases were higher by 19.6 percent in quantity and 24.9 percent in value.

For the first six months of 1956 purchases totaled 12, 230, 924 pounds valued at \$6,089,821--a

decline of 6.7 percent in quantity but an increase of 8.2 percent in value as compared with the first six months of 1955.

Prices paid for fresh and frozen fishery products by the Department of Defense averaged 45.1 cents a pound, 3.6 cents less than in May 1955 but higher by 1.9 cents a pound than the June 1955 average.

In addition to the purchases of fresh and frozen fishery products, the Armed Forces generally make some local purchases which are not included in the data given above. Therefore, actual purchases are somewhat higher than indicated but it is not possible to obtain data on the local purchases made by military installations throughout the country.



Florida

FISHERIES RESEARCH, APRIL-JUNE 1956: The following are some excerpts from the Quarterly Report on Fisheries Research, June 1956, of The Marine Laboratory of the University of Miami.

Mullet: Racial investigations on Florida mullet recently completed indicate that they fall into four populations: (1) an east coast population in the area from Jacksonville to Miami; (2) a west coast population from Everglades northward to Steinhatchee; (3) a northwest coast population of Apalachicola and St. Marks; and (4) a Pensacola population. It is possible that there exists a fifth, at Homosassa, but evidence is too sparse to justify such a conclusion at this time.

On the basis of tagging results, it appears that these populations intermingle somewhat with each other but that in general they represent rather concrete entities. From the tagging results it appears that about 90 percent of these fish stay within 20 miles of their respective home grounds, and that 97 percent stay within 100 miles of their home grounds.

An opportunity to intensify this work was presented when the U.S. Fish and Wildlife Service



made the exploratory fishing vessel George M. Bowers available to the Marine Laboratory for four nights' work on the Tortugas grounds. It was possible with this vessel to sample inshore areas where smaller shrimp are encountered and some sampling was also done further offshore in depths of 19 fathoms which is deeper than the usual depths worked by the Manboy. Larger shrimp were taken in the deeper waters.

A 2-inch mesh size cod end was used for the inshore work aboard the <u>George M. Bowers</u> and the $2\frac{1}{2}$ -inch mesh size for the offshore drags.

Hydrographic, weather, and fishing data were collected on the trips.

Spotted Sea Trout: Nine months of data are now at hand on the life history study of the spotted sea trout, Cynoscion nebulosus, in Florida. This information is providing us with facts concerning the age composition of the population sampled, its growth rate, the location and period of spawning, and the reproductive capacity of the species.

There have been reports of an apparent decline in the fishery. It seems that increased fishing pressure is being placed on this inshore species by sport fishermen and that environmental changes such as dredging, filling, and pollution may also have far-reaching effects on the spotted sea trout as well as other desirable species. Catch records over an extended period of years, from both the commercial and sport fisheries for this species, are being studied to aid in determining the catch per unit of effort and changes which may have occurred.

Fish taken in the samples ranged in size from less than one inch to 34 inches. It appears from the analysis of scale marks and statistical treatment of length frequencies that the oldest were 8 years of age.

Growth appears to be rapid in the first year when an average length of about 6 to 7 inches is attained. Growth is fairly constant throughout life which seems to indicate favorable feeding and activity the year around.

There are indications of a resident population which remains in the Indian and Banana Rivers through the year and a nonresident group which arrives at the onset of cold weather in the north. This is evidenced by the presence of a mixed population of true sea trout, Cynoscion regalis, and the spotted sea trout, Cynoscion nebulosus, in "sea-run" colors off the surf along the central and upper east coast of Florida.

Black Spot in Shrimp: 1. Further experiments with butylated hydroxy toluene ices were carried out to retard black spot in shrimp. Ices containing both the antioxidant BHT and antibiotics were also studied.

- 2. BHT was also applied to shrimp as a dip. One-percent and $2\frac{1}{2}$ -percent dips were prepared. The shrimp were dipped at sea and then stored at the Laboratory in nontreated ices.
- 3. Tests were conducted to determine sodium bisulfite concentrations obtainable with a flake ice machine.

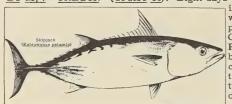
Antibiotic Ices for Shrimp: Further tests were carried out to extend the freshness of shrimp through the use of aureomycin and terramycinices.

Spoilage Determination Tests for Shrimp: Chromatographic analyses of the amino acids inshrimp were continued. The object of this study is to determine whether and what type of relationship exists between the degree of spoilage of shrimp and the quality and quantity of certain amino acids present. It is hoped to use such a relationship as an indicator of recipient spoilage in shrimp.



Gulf Exploratory Fishery Program

EXPERIMENTAL LONG-LINE TUNA FISHING IN NORTH-CENTRAL GULF BY M/V "OREGON" (Cruise 40): Eight days of experimental long-line tuna fishing



in the north-central Gulf of Mexico were completed by the Service's exploratory fishing vessel Oregon during Cruise 40 which ended on July 27 at Pascagoula. Seven sets, averaging 80 baskets (800 hooks) each, were made covering several depth intervals from the surface down to 200 fathoms to obtain further information on depth ranges of Gulf yellowfin tuna stocks.

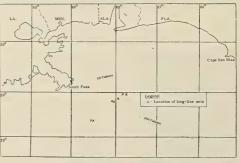
A total of 157 yellowfin (16,770 pounds), ranging from 42 to 177 pounds each, were landed. Fourteen percent of the catch was damaged to some extent by sharks. Average yellowfin catch rates at the various depth intervals fished were as follows: surface--4.0/100 hooks; 10 fathom buoy lines--4.6/100 hooks; 20 fathoms--3.3/100 hooks; 50 fathoms--3.3/100 hooks; 75 fathoms--2.3/100 hooks; 100 fathoms--1.8/100 hooks; 150 fathoms--no yellowfin catch; 200 fathoms--0.4/100 hooks.

The catch included 15 white skipjack, 14 blackfin tuna, 2 small broadbill swordfish, 14 white marlin, 1 blue marlin, 13 dolphin, 31 sharks, and 1 opah. During

the line-hauling operations, 53 white-tipped sharks were killed using a broad-headed lance.

Large schools of mixed blackfin tuna and white skipjack were observed daily. On one occasion, 35 skipjack and 4 blackfin (averaging 15 pounds each) were caught on jackpoles during a 10-minute period while one of these schools fed on a small school of young carangids of the Oregon.

that had gathered under the stern Stomach analyses and forklength measurements were ob-



Cruise 40 of the M/V Oregon.

tained for the entire catch. Bathythermograph casts were made at each end of the long line. Plankton and nightlight dip-net samples were obtained at each station for future study by Service biologists.

A series of 55 yellowfin tuna of different size groups were subjected to various handling and freezing conditions, and samples were frozen for laboratory study by the Service's Technological Section.

Maine Sardines

CANNED STOCKS, JULY 1, 1956: Distributors' stocks of Maine sardines amounted to 154,000 actual cases as of July 1, 1956, a decrease of 81,000 cases (34 percent) from July 1 a year ago. July 1, 1956, stocks were 172,000 cases less than January 1, 1956, according to estimates based on the results of the fifth in a

series of five measurements for the 1955/56 marketing season by the U.S. Bureau of Census.

Canners' stocks as reported by the Maine Sardine Industry totaled 315,000 cases on July 1, 1956. Canners' stocks for the same month in 1955 amounted to 723,000 cases and on January 1, 1956, totaled 475,000 cases.

Canned Maine SardinesWholesale Distributors' and Canners' Stocks, July 1, 1956, with Comparisons											
Type of Stocks	Unit		1955/56 Season 1954/55 Season								
Type of Stocks		7/1/56	6/1/56	4/1/56	1/1/56	11/1/55	7/1/55	6/1/55	4/1/55	1/1/55	11/1/54
Distributors	1,000 actual cases	154	160	268	326	354	235	n.a.	331	n.a.	n,a.
Canners	1,000 standard cases1/	315	64	152	475	625	723	575	715	1, 239	1,410
1/ 100 34-oz, cans equa	al one standard cas	se.			n. a	not available,					

The Maine sardine pack April 15 (the beginning of the season) to July 1, 1956, totaled 473,000 cases, which added to an April 15 carryover of 120,000 cases gave a total available supply at the canners' level of 593,000 cases. On December 1, 1955, the carryover was 690,000 cases, plus the pack for 1955 of 1,255,000 cases, gave a total available supply of 1,945,000 cases for the 1955/56 marketing season compared to an available supply of 2,875,000 cases for the 1954/55 season.



Maine

LANDINGS OF FISHERY PRODUCTS, 1955: During 1955 over 255 million pounds of fishery products, valued at more than \$16 million exvessel, were landed at Maine ports. This represented a decrease of 28 million pounds or 10 percent in quantity and 772 thousand dollars or 5 percent in value as compared with the previous year. Compared with 1954, herring landings (99.4 million pounds) decreased 24 million pounds and ocean perch receipts (67.7 million pounds) decreased nearly 12 million pounds. Whiting landings (25 million pounds) increased almost 16 million pounds during the year. Landings at Portland totaled 68.2 million pounds valued at 2.3 million dollars during 1955 while Rockland landings amounted to 48, 8 million pounds valued at 1.6. million dollars in the same period. Three species, ocean perch, whiting, and sea herring, made up 85 percent of the quantity of finfish landed and 77 percent of the value. Comparable figures for 1954 were 83 percent in quantity and 78 percent in value. In the shellfish group, lobsters contributed 81 percent of the quantity and 82 percent of the value as compared with 76 percent in quantity and 78 percent in value in 1954.

Species 1955 1954										
DDCCICO	1,000 Lbs.	\$1 000								
Fish:	1,000 LDB.	\$1,000	1,000 EDB.	91,000						
Cod	2,467	141	3, 252	192						
Haddock	4, 009	276	4, 885	39						
		103	3, 175	150						
Hake, White Pollock	2,398	103	4, 127							
	5,052			10:						
Cusk	603	34	724	42						
Halibut	134	37		29						
Mackerel	1,011	79	473	60						
Flounders:	1									
Gray sole	1,182	91	1,273	93						
Lemon sole	17	1	2							
Yellowtail	30	3		1						
Blackback	918	66		93						
Dab, sea	1,386	84	1,654	90						
Ocean perch	67, 685	2,577	79,671	3,200						
Whiting	25, 114	266	9,318	110						
Wolffish	111	4	131							
Shark	27	1	37							
Tuna	26	3	3							
Alewives	3,779	33	3, 296	21						
Herring, Sea	99,416	1,353		1,770						
Smelt	127	39		25						
Butterfish	177	16	20	1						
Eels	33	6	11							
Menhaden	4.016	42	5,877	41						
Miscellaneous	7,610	62	12,496	10						
Total Fish	227, 328	5.442	255, 440	6.54						
			,	-						
Shellfish, etc.:	499	26	520	27						
Crabs	2, 621	949	3, 722							
Soft clams	2,621	74	3,722	1,36						
Hard clams										
Lobsters	22,718	8,716		8, 08						
Oysters	3	2	6							
Sea scallops	1,114	581		334						
Mussels	105	3	81							
Periwinkles	8	3		1						
Sea urchins	58	2	55							
Bloodworms	203	167	240	20:						
Sandworms	179	110	284	16'						
Sea moss	125	3	465							
Miscellaneous	220	6	422	13						
Total Shellfish, etc.	28, 103	10,642	28, 469	10, 30						
Grand Total	255, 431	16.084	283, 909	16.85						

* * * * *

ADVERTISING CAMPAIGN LAUNCHED BY SARDINE CANNERS: The Maine Sardine Industry on July 21 launched a 13-week concentrated advertising and mer-



chandising campaign in 10 southern states--Virginia, South Carolina, North Carolina, Georgia, Louisiana, Florida, Alabama, Tennessee, Mississippi, and Texas.

The Executive Secretary of the Maine Sardine Industry said that newspapers would be used in 47 cities plus a schedule of more than 18,000 radio spots over 97 stations in 70 cities. He stated that the advertising would be supported by an aggressive merchandising program.

The theme of the campaign will feature "Sardines from Maine or Maine sardines in the familiar flat can that you and your folks have been buying for years" as an all-around low-cost convenience food.

The Executive Secretary said that the Industry enjoyed almost a 100 percent retail food-store distribution in the 10-state area and that the activity was designed to "further develop this big and important market."

A similar campaign is planned for the winter-Lenten period, he stated.

* * * * *

SARDINE INDUSTRY DEVELOPMENT PROGRAM: New England and New York bankers were given a first-hand look at the Maine sardine industry in July. They not only toured a couple of plants on the Portland waterfront, but were given a thorough briefing on the industry's 25¢-a-case State-financed development program. A total of 22 bank officials and 25 representatives of the various sardine-canning firms attended.

The bankers were told that they had been invited so they could be concisely and expertly informed of developments which have "caused competent outside observers to state that the industry has made more advances in the fields of processing, quality control, and merchandising in the past five years than in the previous eighty," states a July 26 release from the Maine Sardine Industry.

These were among the opening remarks of a member of the Council and President of the Maine Sardine Packers Association.

He emphasized that this program was made possible through the self-imposed tax which enabled the industry, by pooling its funds and problems, to have the same advisory and counseling services as are used by America's largest and most successful corporations.

The tax is collected from the packers by the State and expenditures are under the direction of a seven-man State-appointed Council of packers with disbursements being made through the office of the State Controller.

Asserting that the development work was becoming progressively beneficial to the packers, he added that it was also helping to bolster the economy of the State in general and especially the many communities which are largely dependent upon the sardine fishing and processing operations. He also felt that few industries in the United States were acting collectively to better effect and with such a unified approach as the Maine sardine canners.

A resume of the industry's scientific, technical, and grading research programs was given by the Research Director, who expressed high hopes that the use of a common grading system would do much to enable the packers to improve and modernize their product. He also told of several applications of new scientific developments which might, after further investigation, produce better control of processing and possibly operating economies.

A New York auditing firm reviewed the industry's cost-research activities while a market research firm summarized the conclusions reached as a result of the industry's three-year market and research program. The industry's advertising agency illustrated the ways which market research was being put to use in planning the advertising campaigns for Maine sardines.



North American Wildlife Conference

MEETING TO BE HELD MARCH 4-6, 1957: Lloyd W. Swift, Technical Sessions program chairman for the 22nd North American Wildlife Conference, announces that chairmen have been selected for the six technical sessions of this forthcoming international conservation conference that will be held March 4-6, 1957, in the Statler Hotel, Washington, D. C., according to the Wildlife Management Institute, sponsor of these large annual meetings.

Swift, who is representing The Wildlife Society, the organization of professional fish and game workers that formulates the technical sessions program of these annual conferences, is Chief of the Division of Wildlife Management, U. S. Forest Service.

All persons having papers that merit consideration for presentation during the technical sessions program of this large international conference should send them to the appropriate session chairman before the deadline date, November 15.

The three-day North American Wildlife Conference consists of three general and six technical sessions. The General Session program committee has been meeting, and the complete conference program will be announced in the near future.

Among the technical sessions listed are: Marine and Coastal Resources (Chairman: Clarence P. Idyll, Marine Laboratory, University of Miami, Coral Gables, Fla.), March 5; Wetlands and Inland Water Resources (Chairman: Frank C. Bellrose, Jr., Illinois Natural History Survey, Urbana), March 4; and Conservation Education (Chairman: John D. Bulger, National Wildlife Federation, Route 2, Groton, N. Y.), March 6.



North Atlantic Fisheries Investigations

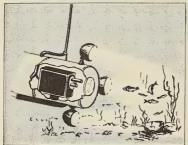
GEORGES BANK SEA SCALLOP BEDS SURVEYED BY M/V "ALBATROSS III" (Cruise 77): A survey of the sea scallop beds of Georges Bank by means of dredging and underwater photography and the tagging of as many scallops as possible was the purpose of Cruise 77 (July 5-11, 1956) of the Service's research vessel Albatross III.

A total of 22 stations were occupied with the 11-foot scallop dredge. All scallops were measured and 2,075 of them were tagged and released. Drops of tagged scallops were made at 10 different locations.

Heavy winds and sea restricted the use of the underwater camera. Photographs (250 individual pictures) were taken at six stations, however.

* * * * *

UNDERWATER TELEVISION AND COMMUNICATIONS TESTED BY M/V "AL-BATROSS III" (Cruise 78): In order to test underwater television chain, underwa-



Artist's conception of equipment for underwater tele-

ter communications, and related equipment the Service's research vessel Albatross III operated in Buzzards Bay on July 16-17.

Several lowerings of the camera were made with the assistance of SCUBA divers in 40-45 feet of water. Several additional lowerings were made to depths of 100 feet without the assistance of divers.

The underwater communications system developed at the Service's Woods Hole Biological Laboratory performed excellently in the tests.

Extreme turbidity restricted tests of the range of visibility and resolution of the camera. Sufficient natural illumination was available for operation to depths of 80-90 feet.

Stable operation of the television equipment resulted from the use of a portable 60-cycle gasoline generator.

TAGGING IN GULF OF MAINE BY M/V "T-79" (Cruise 2): Tagging in the Gulf of Maine was the purpose of the Service's research vessel T-79 cruise 2 (June 28-July 14, 1956). The cruise was carried out in three phases using Gloucester, Mass. as the base of operations. Phase I covered the period June 28-July 2; phase II took place July 4-9; and phase III was completed July 10-14.

Thirteen sets were made, each consisting of two tubs of line-trawl gear. Frozen herring and frozen squid were used as bait. Haddock were tagged with the following types of tags:

Petersen discs--white, yellow; through the gill cover or through the back in front of the first dorsal fin.

Lea bridle -- in front of the first dorsal fin.

Combination tag using a Lea hydrostatic connected to an internal anchor.

Stainless steel pins and wire were used to fasten the disc tags.

Cod and halibut were tagged with the combination tags only, Dogfish were tagged with Petersen discs through the nose or through the dorsal fin.

Scales for age and growth analysis were taken from haddock tagged during phase III.

A total of 259 haddock, 138 cod, 120 dogfish, and 12 halibut were tagged.

North Atlantic Herring Research

SHOAL WATERS NEAR ISLANDS EXPLORED FOR HERRING OFF MAINE AND CANADA BY M/V "METACOMET" (Cruise 4): Fishing and fish-finder soundings for herring were continued on Cruise 4 by the Service's chartered exploratory fishing vessel Metacomet in United States waters of the Gulf of Maine from Cape Por-

poise to Eastport, and in the Canadian waters of Grand Manan Island, Grand Manan Shoals, St. Marys Bay, and Lurcher Shoal.

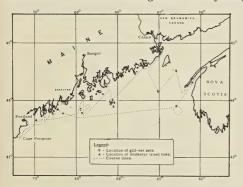
Emphasis was placed on exploring and sampling the shoal waters near islands and rocks offshore for herring in an effort to gain more information concerning the occurrence and distribution of this species in and near areas where sardine-size fish were still reported scarce or absent at the time of this cruise which began July 10 and ended July 21.

Herring gill-net sets and tows with a British Columbiatype midwater trawl were made at the points indicated in the chart.



Metacomet, vessel chartered by the Fish and Wildlife Service to continue program of exploratory fishing and gear development for the Maine herring.

Three bushels of herring were taken in 4 half-hour to one-hour tows of the midwater trawl near Petit Passage in St. Marys Bay, Nova Scotia. The fish taken in



U.S. Fish and Wildlife Service Cruise 4 of chartered vessel M/V Metacomet.

these tows were herring brit which averaged 2.1 inches and sardinesize herring of 4.7 inches average length. The larger fish comprised nearly all of the 3-bushel catch. A good showing of herring was observed on the fish-finder throughout the night in this area. Small quantities of large herring ranging in size from 8.0 inches to 14.0 inches were taken in gill nets at Fisherman Island near Boothbay Harbor, at Mt. Desert Rock, at Yellow Head Island and Howard Cove in Machias Bay, and off Old Proprietor Whistle Buoy on the southeast side of Grand Manan Island. The best showings of herring were observed on the fish finder at Mt. Desert Rock, in Machias Bay, and in St. Marys Bay.

A good showing of fish near the surface was observed between Pemaquid Point and Seguin Island the evening of July 20. A sample obtained with the midwater trawl established these fish as whiting.

The $\underline{\text{Metacomet}}$ was expected to depart on Cruise 5 on July 31, 1956, for 11 days. Coastal and offshore waters of the Gulf of Maine were to be explored with

the fish finder and fished for herring in an effort to learn more of the occurrence of these fish at this season. Gill nets and a midwater trawl were to be used.



North Pacific Exploratory Fishery Program

ALBACORE AND SALMON OFFSHORE DISTRIBUTION STUDIES IN NORTH PACIFIC (M/V "JOHN N. COBB, "Cruise 28): Offshore gill-netting to determine the distribution of albacore tuna and salmon in a section of the northeastern Pacific Ocean will be the primary objective of a 7-week cruise by the Service's exploratory fishing vessel John N. Cobb, which was scheduled to leave Seattle on July 16, 1956.

The <u>Cobb</u> was expected to cover the waters from 42° N. latitude to 50° N. latitude and west to 145° W. longitude, an area from the Oregon-California border to northern Vancouver Island extending



Removing albacore from the gill net. Roller at right takes off from the main winch.

northern Vancouver Island extending up to 800 miles offshore, an area approximately 300,000 square miles.

Landing of albacore in Washington and Oregon reached an all-time high of 34 million pounds in 1944, butfluctuated greatly and declined to less than 3 million pounds in 1952. In recent years practically no albacore have been caught north of California. It is hoped that this year's coordinated research program will help to throw some light on the mysteries of albacore movements, distribution, and availability to the commercial fishermen.

Nylon gill nets, ranging in mesh size from $3\frac{1}{4}$ inches to $8\frac{1}{2}$ inches to catch both large and small salmon and albacore, were expected to be fished at night. Albacore trolling gear were to be fished during the day while running between stations. If schools of albacore are located, the fishing fleet was to be notified immediately by radio.

The salmon research is part of the broad high-seas salmon program being carried out this year by member nations of the International North Pacific Fisheries Commission. The catch will be frozen and returned to Seattle for scientific racial analysis and comparison with salmon caught in other areas of the north Pacific by other research vessels.

The University of Washington's oceanographic research vessel \underline{Brown} \underline{Bear} was to work in close conjunction with the \underline{John} N. \underline{Cobb} for most of the cruise. The \underline{John} R. Manning, from the Pacific Oceanic Fisheries Investigations in Hawaii, was to operate north of Hawaii and west of 145° W. longitude. The three vessels will attempt to keep in radio contact at sea to exchange fishing information and other observations.

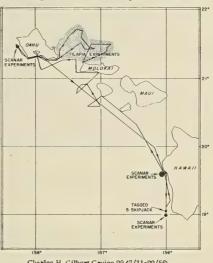


Pacific Oceanic Fishery Investigations

"CHARLES H. GILBERT" USES ELECTRONIC FISH FINDER TO SCOUT FOR TUNA (Cruise 29): The whereabouts and movements of Hawaii's skipjack and large tuna (aku and ahi) may soon be an open book to fishery scientists of the U.S. Fish and Wildlife Service, judging by the results of experiments recently carried out off

the Island of Hawaii aboard the research ship Charles H. Gilbert using the vessel's new "Sea Scanar." This is a long-range sonic fish finder which detects fish under the water by bouncing sound waves off their bodies, picking up the echoes, and making them visible on a radarlike screen. According to the director of the Pacific Oceanic Fishery Investigations, the calm waters off the Kina coast of Hawaii were chosen as an ideal setting for testing the capabilities of the device on various natural and artifical targets and for training the scientific personnel who will use it to locate and track fish schools.

The scientists aboard the vessel. reported that metal targets suspended under water were detected as much as 2,000 feet from the ship under favorable calm sea conditions. A dead skipjack tuna similarly suspended was spotted at a range of 1,000 feet, as was a much smaller herring, the well-developed air bladder of which acts as aresonating chamber and gives a strong echo of the fish-finder's sound waves. In ad-



Charles H. Gilbert Cruise 29 (7/11-22/56).

dition to these "planted" targets, such natural features of the Kona seascape as schools of skipjack, dolphinfish (mahimahi), blackfish (a small whale), and porpoise were picked up and studied on the fish finder.

When the technique of using the new instrument has been worked out, it will be employed by the fisheries scientists studying the tuna resources of the central Pacific to locate schools of tuna which do not betray their presence by signs on the surface of the ocean. At present the researchers, like the commercial fishermen, are almost entirely dependent on sightings of bird flocks over feeding schools to lead them to fish. It is suspected, however, that there may be large concentrations of skipjack and other tuna in areas far from land where sea birds are not very abundant, and even in active fishing grounds like the waters close to the Hawaiian Islands there may be many tuna schools which escape notice because they do not happen to be accompanied by flocks of birds at the times when fishing boats pass near them. If there actually are such hidden fishery resources within the area covered by POFI investigations, the fish finder should reveal them. It is expected, too, that the instrument will provide more exact knowledge of the magnitude of the schools of tuna that are at present located and fished by conventional methods, for it seems likely that for many schools the fish seen and taken at the surface may, like the visible part of an iceberg, represent only a small fraction of what is hidden beneath the

During the cruise period of July 11 to 22, in addition to the special experiments off Kona, the vessel scouted for tuna sonically and by conventional methods between Hawaii and Oahu and around the islands of Molokai, Lanai, and Maui.

Experiments conducted with the "Sea Scanar" to determine the maximum range of positive returns from various targets gave the following results: 24-inch stainless steel triplane (each plane a circle of 24-in. diameter)--2, 180 ft., 12-in. aluminum triplane (each plane a 12-in. square)--2, 080 ft., 3-in. brass triplane (each plane a 3-in. square)--1,800 ft., 1 skipjack (20 lb., frozen)--1,020 ft., 1 herring (18 cm., dead)--1,100 ft.

Data were collected to determine the amount of sea return under various conditions and to enable the establishment of a sound search procedure. These await analyses. Returns were recorded from skipjack (<u>Katsuwonus pelamis</u>) and dolphin (<u>Coryphaena hippurus</u>) schools and porpoise (unidentified) and blackfish (<u>Globicephala</u> sp.) herds.

During the 2 days of testing tilapia (<u>T. mossambica</u>) as live-bait, 12 skipjack tuna schools were contacted. Tilapia was chummed at 9 schools and nehu (<u>Stole-phorus purpureus</u>) at 8 schools. Five schools responded to the tilapia by surfacing. One of these was attracted to the stern of the vessel but no fish was caught. Five schools also surfaced after nehu but 4 of these were attracted to the vessel. Two, 5, 9, and 40 (fishing was purposefully terminated after 40) skipjack were caught from these schools. The tilapia used were generally 3 to 4 inches long (larger than optimum size) and tended to sound when chummed. Examination of the skipjack stomachs showed that they readily accepted the tilapia as food.

Five skipjack (5-lb. size) were tagged; 3 with plastic dart tags, 1 with the blue California-type G tag, and 1 with the white California-type G tag.

In 66 hours of scouting, 18 skipjack, 10 dolphin, 1 yellowfin, and 9 unidentified schools were sighted.

The vessel departed Pearl Harbor July 11, 1956. In the vicinity of Oahu and Molokai, tested tilapia as live-bait for attracting skipjack on July 11 and 12. Determined the operating condition of the "Sea Scanar" off Waianae, Oahu, on July 13. Conducted "Sea Scanar" experiments off Kailua, Hawaii, from July 15-20. Scouted for fish schools en route to Oahu from Hawaii, July 20-22. Arrived Pearl Harbor July 22.

* * * * *

REVIEW OF FISCAL YEAR 1956 OPERATIONS: The significant developments by the Service's Pacific Oceanic Fishery Investigations (POFI) during Fiscal Year 1956 (July 1, 1955-June 30, 1956) may be briefly summarized as follows:

Elucidation of a hypothesis to account for fluctuations and trends in the success of long-line fishing for yellowfin tuna in the Line Islands area of the central equatorial Pacific, based on a positive correlation between catch rate and water temperature.

Development of a new method of handling long-line gear to effect a saving of manpower.

Drastic curtailment of the program in the vicinity of the Line Islands and formulation of broad general plans to investigate the tuna resources in the area of the Marquesas, Tuamotus, and Society islands and eastward.

Initiation of an intensified skipjack tuna investigation aimed at explaining variation in fishing success in terms of meteorology, oceanography, and fish behavior.

Discovery of an apparent relationship between the summer skipjack catch and the prevalence of trade winds during the spring.

Demonstration that albacore tuna occurrence in the central North Pacific is associated with the Polar Front, which shifts seasonally and which may be regarded as a migration pathway.

Discovery of unfished albacore resources 200-500 miles off the coast of Oregon.

Evidence that the albacore, unlike the yellowfin, comprises one large population with its primary source in the western central Pacific.

The first recoveries of tuna tagged by POFI were made (including 2 albacore, 2 big-eyed, 12 skipjack, and 1 yellowfin tuna), thus justifying this method of studying tuna migration in the Pacific.

Initiation of a Pacific-wide cooperative albacore tagging program, with POFI sparking the venture in mid-ocean and off the coast of Japan.

Demonstration of the possible use of plankton indicator species to identify water masses and potential albacore waters in the central North Pacific.

Initiation of a worldwide tuna larva exchange program and acquisition of a worldwide collection of tuna larvae taken by the \underline{Dana} , permitting a more positive approach to the problem of tuna larva identification.

Demonstration that yellowfin exhibit electrotaxis and that their movements can be directed with rather moderate power sources when suitably applied.

Successful participation in Norpac and Eastropic, synoptic cooperative surveys of the North Pacific and of the eastern equatorial Pacific, respectively.

Selection of POFI as the locale for a highly successful informal international conference for the exchange of Norpac data, planning the Norpac Atlas of results, and formulating plans for Equapac, a cooperative synoptic survey of the central and western equatorial Pacific.

Cooperation with other research agencies in conducting fishing surveys of the North Pacific, particularly with United States and Canadian agencies of the International North Pacific Fisheries Commission, in pooling resources for sampling the stocks of oceanic salmon and albacore.

Initiation of close collaboration with the University of Hawaii in terms of cooperative research, assistance in graduate training, and providing part-time employment for students. The latter is particularly important because it augments the supply of qualified fishery workers.

Equatorial Yellowiin Tuna: A program of year-indund sampling of the yellowfin populations in the Line Islands area, initiated in January 1955, was completed this year. The results of this program show that long-line or deep-swimming tuna were generally scarce during the year. Catches fluctuated from 1 per 100 hooks to about 3 per 100 hooks with little indication of the seasonal variation evident in earlier years. The low availability of deep-swimming tuna was paralleled by a low availability of troll-caught surface tuna.

With respect to troll fish the highest catches were made during March and April. It was also evident that the catch rates of surface fish were higher in the northern Line Islands. These islands lie in or near the Countercurrent, an area that has been previously shown to support larger numbers of surface fish than the waters to the north and south.

It is particularly significant to note that during this period of low yellowfin abundance water temperatures at Christmas Island were unusually low, that is, relative to the 1950-53 period, providing additional evidence supporting our hypothesis in respect to fluctuations in equatorial deep-swimming tuna. Briefly this theory proposes that near the equator cooler water indicates newly enriched water in which the biota to support a large yellow-fin population has not yet developed. Conversely warmer water near the equator is thought to be upwelled water that has been in the euphotic zone long enough to develop a food supply for tuna. In this connection ocean water temperatures at Christmas Island station took an upward turn during the spring of 1956, suggesting that the environmental conditions associated with the high level of abundance during this period 1950-53 may reassert themselves this year.

Incidental to the study approximately 1,000 yellowfin tuna were tagged during the course of the one year program. To date there has been but a single recovery, a yellowfin tagged and recovered at Fanning Island. The fish had been at liberty for

six months prior to its recovery on April 3, 1956. This single recapture is of considerable interest in that it supports the contention that there are small localized populations of yellowfin tuna associated with each of the small islands in the central Pacific.

The central Pacific program is essentially complete, and future effort will be focussed on the Marquesas and eastward. As time permits, observations designed to test the hypotheses outlined will be completed.

Hawaiian Skipjack Distribution and Abundance: A major effort this year has been the initiation of a detailed program designed to ascertain the ecological requirements of skipjack and the factors in the ocean responsible for their presence and absence, both seasonally and geographically. The program involves measurement and analysis of hydrographic factors, and measurement and analysis of plankton in terms of level of abundance and distribution in the ocean. Major reliance is being placed on the Hawaiian commercial fishery for information on the distribution and abundance of skipjack in space and time. In this connection analyses have been initiated on the statistics of the local catch, utilizing small areas and short periods of time as sampling units. In order to encourage maintenance of good records, brochures have been prepared and distributed to skipjack fishermen, introducing them to the general program and soliciting their support.



An additional phase of the skipjack program is examination of existing oceanographic and meteorological material in order to ascertain the reasons for annual fluctuations in the supply of skipjack. A preliminary hypothesis has been developed based on the relationship between the windflow over the island area and the skipjack catch. Briefly there is a high, positive correlation between the amount of catch during the summer or "season" months and the direction and strength of the winds during the late spring. It appears that the winds may affect the environment of the skipjack through their control of oceanic circulation. The hypothesis appears to form a valuable starting point for exploring this question of annual fluctuation, which is so important to the Hawaiian fishery as well as to similar fisheries elsewhere.

In order to learn something of the migrations and growth of skipjack, a total of 945 fish were tagged in Hawaiian waters with California-type spaghetti tags. To date there have been 12 recoveries; 9 recaptured by live-bait fishing and 3 found in the stomachs of long-line caught big-eyed tuna and yellowfin tuna taken by commercial fishermen around Hawaii. The recoveries have indicated rather limited movement, the maximum net distance traveled being about 40 miles. All but one of the fish were out for less than 3 months. However, one was at liberty for slightly over 8

months and during this period grew about 7 pounds. This growth rate agrees very well with past studies on the growth of Hawaiian skipjack based on size-frequency analysis.

As implied above, the modified and augmented skipjack program is only a few months old. At least one year's work is needed for a preliminary evaluation of the results.

North Pacific Albacore Program: One objective of this program is to explore the area north and east of the Hawaiian Islands for potential fishing grounds and to collect basic chemical and physical data to use in the analysis of our fishing results. The second has been to work "upstream" of the American coastal albacore fishery to investigate the biological and physical causes of the violent fluctuation in the catches of this fishery. In support of these studies, investigations are also being made of the oceanwide distribution of albacore, albacore growth rate and spawning, races of albacore, North Pacific weather, and the distribution of plankton.

As in the past, in order to obtain the most efficient use of available vessels and personnel, POFI cooperated closely with other agencies in the planning and execution of the field program. Formal coordination of the exploratory fishing program with those of research agencies of the Pacific states was through the Albacore Steering Committee. Informal cooperation through the Eastern Pacific Oceanic Council resulted in Norpac, a quasi-synoptic physical, chemical, and biological survey of the North Pacific during July and August 1955, which involved vessels from the United States, Canada, and Japan. A significant contribution to the summer distribution of albacore was also made by U. S. Fish and Wildlife Service vessels surveying the salmon distribution during July-September 1955 when they fished far enough south to show the northern limit of albacore in mid-ocean,

Three exploratory fishing cruises were made during the year to determine the distribution and abundance of albacore to the north and east of the Hawaiian Islands.

The surveys during the past have been directed primarily towards determining the limits of distribution of albacore tuna and associated environmental factors. As data have been accumulated and analyzed emphasis has shifted from subsurface to surface fishing and the principal gear to be used in the future will be the gill net supplemented by trolling. It is hoped that the results obtained by these fishing methods will enable us to define the areas of commercial abundance.

Data concerning catch rates and length frequencies of albacore tuna were compiled from all possible sources in the literature in order to form the basis of a working hypothesis for their distribution and abundance in the North Pacific. The data were not extensive but they seem to indicate that there is a single population of albacore which has its primary nucleus and source in the waters of the islands of the western central Pacific. Literature search and analysis of this type of data will be continued.

Through the Albacore Steering Committee POFI has encouraged a Pacific-wide albacore tagging program, the general objectives of which are to more clearly define the migratory routes of the albacore and to clarify the relationships between the fish taken on both sides of the Pacific and within the central Pacific. Continuing its pioneering program, during 1956 the California Department of Fish and Game agreed to tag some 2,000 fish off the West Coast with the assistance of the Oregon Fish Commission. POFI agreed to tag as many



fish as possible in midocean, and to provide tags for the albacore that might be caught during salmon research cruises of vessels of Canada, the U.S. Fish and Wildlife Service, and the University of Washington. In addition, in May a team of two POFI biologists was sent to Japan to tag albacore and to instruct Japanese technicians in tagging methods. There was considerable interest in this work and through the excellent cooperation of the Japanese, the POFI representatives tagged 270 albacore off the coast of Japan. Based on this experience the Japanese are planning to tag 2,000 albacore during the spring of 1957.

Since the inception of the albacore program POFI has tagged and released 201 albacore and 82 big-eyed tuna in the central North Pacific. Four recoveries were reported this year, 2 of albacore and 2 of big-eyed.

Economical Means of Harvesting Tunas: A new method for handling cotton long-line gear was developed during the year. This method involves flaking down a continuous mainline into a large tub rather than breaking the gear into individual baskets. Using this method we have been able to rather easily fish up to 1,000 hooks a day. Though there were 11 men on the fishing vessel, it appeared that this amount of gear could have been rather easily fished by 6 men. This indicates a more efficient operation than that of Japanese commercial fishermen who fish around 2,000 hooks with crews of 25 to 30 fishermen. Further tests of this method are needed before it can be stated with certainty that it has commercial possibilities. However, all indications to date are favorable.

Steel gear, which had been tested earlier, was finally shown to be rather inefficient when applied to tuna long-line fisheries. Though it, too, holds promise of getting more hooks in the water with fewer men, there are rather severe problems associated with its use. For one thing, steel is expensive and does not last long in the field because of excessive kinking under the strain of holding heavy fish. Perhaps even more important, however, the steel gear does not appear to capture tuna as efficiently as cotton gear. There is evidence to indicate that this is because of its lack of resiliency and its failure to provide a drag on the fish's struggle to escape.

Sonic Ranging: A new and potentially promising sonic scanning device was received in December. To date most of the effort has been devoted to ironing out bugs in design and construction. It appears we are now in a position to (a) learn how to use it effectively, and (b) apply it where pertinent to our present studies on tuna behavior and distribution.

Contract Research: Contracts with the University of Hawaii enable us to utilize the services of experienced faculty researchers in specialized fields of biology, physics and chemistry in coping with basic research problems of importance to our program. Three projects were actively pursued during the year as follows:

TUNA VISION: This project, started in June 1955, stemmed from our unsuccessful attempts to devise a substitute for tuna livebait, our observation that vision was the predominant sense in tuna feeding, and our belief that fundamental research on vision might suggest a new approach to the solution of the tuna bait problem. The objectives for the first year were (a) to determine if there were anatomical or morphological differences in the eyes of different sizes and species of tuna which might be associated with different habits and habitats, and (b) to determine the optical potentials of the tuna eve. Comparison of the eves of small and large skipjack (surface fish) with large yellowfin (deep-swimming fish) so far has revealed no basic differences in shape, structure, musculature, or retinal mosaic pattern, despite the difference between species in habit and habitat. Fresh whole eyes, with an artificial opaque viewing screen covering an aperture in the retinal-chorioid layer, and a movable pin-point light source were immersed in a long trough of sea water to determine the distance of acute vision. Problems arose because of variation in the position of the lens at rest and the difficulty of devising an apparatus to move the lens and thus to simulate accommodation. These problems have not been solved as yet. A new contract for a comparative histological study of the retina of different tuna species, with special emphasis on the distribution and ratio of the rods and cones was initiated June 1, 1955.

ELECTROFISHING: An investigation of the possibility of using electrotaxis as a means of harvesting tuna was continued. Last year, based on preliminary experiments with aholehole in a small tank, an apparatus was devised which theoretically should create an electric field sufficient to control the movements of tuna in a large concrete tank, 35x11x4 feet in size. The apparatus, employing pulsed D. C. generated by intermittent charging and discharging of a bank of condensers and powered by 10 6-volt storage batteries, was tested on tuna and other fish during the year. With this apparatus, it was possible to control the movements of 8- to 10-pound yellowfin over a distance of 16 feet, using a frequency of 18-20 cycles per second. These results are regarded as highly significant (a) because they are the first demonstration that tuna respond electrotactically, (b) because of the relatively low power source, and (c) because of the probability that the dissipation of energy in the well-grounded tank was comparable in magnitude to that which would be encountered in the open sea. However, the principle of condenser discharge was not pursued further because of problems which would be encountered on board ship in devising a satisfactory mechanical or electronic current interruptor. Rather, attention was directed to the possibility of using a modified amplidyne-generator assembly to produce a field of sufficient strength between widely spaced electrodes to control the movements of tunas in the open sea. Preliminary experiments on modifying available generator units have shown promising results. The 1955 contract was extended to August 31, 1956, to complete this phase of the study.

OFF-COLOR TUNA: In initial attempts at commercially fishing the yellowfin tuna resources discovered in the central equatorial Pacific, a relatively large percentage of the catch was rejected at the cannery because of a "green" or "off-color" condition which developed during processing. Contract work was undertaken to identify the pigment responsible for this condition and to determine the chemical processes involved. In other words, the project was aimed at providing basic information which might be useful to industry in their problem

of identifying the incipient condition in raw fish and in preventing its appearance during processing. It was found (a) that in raw fish the pigment associated with incipient "greening" was a peroxidase-like or myoglobin-like heme-protein, (b) that oxidation of this pigment is involved in the formation of the condition, (c) that substances, such as ascorbic acid, which may act as reducing agents, tend to inhibit the condition, and (d) most important, that the "green" appearance following precooking is not due to the production of a green pigment, but rather is due to an abnormal lack of reddish pigmentation. These fundamental studies are being followed with great interest by technologists both in Hawaii, on the mainland, and in Japan. The problem of "greening" has been encountered in the Japanese winter long-line fishery for albacore in the North Pacific and may become of importance to American industry should large albacore be encountered between Hawaii and the mainland.

A new contract continuing the study of "off-color" tuna was negotiated June 1, 1956.



Public Eating Places Survey

FISH AND SHELLFISH QUALITY STANDARDS NEED RECOGNIZED BY MOST EATING PLACES: Two-thirds of all the operators of public eating places serving fish and shellfish in the United States who expressed an opinion on the question "Do you believe that there is a need for grade or quality standards for the fish and shellfish you buy?", indicated that grade or quality standards are needed. About 1 out of 5 who were asked the question were undecided. When the establishments are classified on a regional basis, the opinions are quite similar to those found for the

Recognition of I	Recognition of Fish and Shellfish Quality Standards Need by Public Eating Places Serving Fish or Shellfish, by Geographic Region										
Geographic Region	All P		Need G or Qua Standa	lity	Do Not Grade Quali Standa	or	Do N Kno		No Reply		
United States Total	No. 208, 100	100.0	<u>No.</u> 105, 200	% 50.6	No. 52, 100	<u>%</u> 25.0	No. 46, 700	22.4	No. 4, 100	<u>%</u> 2.0	
By Region: Northeast North Central South	68,000 59,700 45,900 34,500	100.0 100.0 100.0 100.0	29, 700 22, 900	49.8 49.9		29.1 23.5		18.3 23.8	600 1,700 1,300 500	2.8	

United States as a whole. The findings are based on a scientific sample survey of 4,500 establishments representative of all public eating places in the United States, including 208,000 serving fish and shellfish.

Final results of the survey, which is being financed by funds made available under the Saltonstall-Kennedy Act of 1954, are scheduled for publication this year.

* * * * *

FREQUENCY OF FROZEN FISH AND SHELLFISH SALES TO EATING PLACES: According to the results of a scientific sample survey of 4,500 establishments representing all public eating places in the United States, most of them order frozen

fish and shellfish supplies weekly. Many of them, however, order supplies daily; others as infrequently as once a month.

Almost 90,000, or 43 percent, of the 208,000 public eating places serving fish and shellfish in the United States order frozen fish and shellfish supplies once each

week. About 16 percent order supplies every 2 to 4 days. Another 9 percent place orders for fish and shellfish 1 to 3 times a month. Only 6 percent of the public eating places order supplies daily.



Many of the larger restaurants (annual sales from food of \$100,000 or more) are included in the 6 percent ordering frozen fish and shellfish daily. About 30 percent of these large restaurants order daily and an additional 34 percent order 2 to 4 times a week. Only 16 percent of these restaurants order on a weekly basis.

	Frequency of Frozen Fish and Shellfish Sales to Public Eating Places																	
Item	All Pu Eati Plac	ng es	Eve Day		2 to Tim A We	es ek	Onc A Wee	k	2 or Time A Mo	nth	Onc A Mon	th	Less T Once Mont	A th	Whene	ed	No R or N Applie	lot
United States Total	No. 208, 100	% 100.0	No. 12,900	6.2	No. 32,600	15.7	No. 89,800	% 43.1	No. 10,000	% 4.8	No. 7,700	3.7	No. 2,700		No. 12,000	5.8	No. 40, 400	½ 19.4
By Region: Northeast. North Central South West	68,000 59,700 45,900 34,500	100.0 100.0	4, 300 3, 200 2, 800 2, 600	5.4 6.1	8,800 8,500	14.7 18.5	26,800 32,900 17,900 12,200	55.1 39.0	2,700 1,800	4.5	2,600	4.4	600	1.0		4.7	9,000	10.2 19.6
By Type of Establishment: Restaurants Cafeterias Restaurants or cafeterias inhotels Drug or proprietary stores with fountain service Other 1/	105,700 4,300 15,300 9,800 73,000	100.0 100.0	3,500 3,500	4.6 22.9	800 3,100 800	18.6 20.2 8.2	2,500	51.2 32.0 25.5	100 700	2.3 4.6	100 300 700	2.3 2.0 7.1	100	1.0	300 600 100	7.0 3.9	2,200	14.0 14.4 38.8
By City Size (Population): 500, 000 or more 100, 000 to 499, 999 25, 000 to 99, 999 2, 500 to 24, 999 Less than 2, 500	42,600 26,100 27,400 39,900 72,100	100.0 100.0 100.0 100.0	3,600 3,700 2,100 1,600	8.5 14.2 7.7 4.0	6,500 5,600 4,400 6,000	15.3 21.4 16.1 15.0	16,400 9,200 13,100 18,500 32,600	38.5 35.3 47.8 46.4	1,500 800 1,200 2,000	3.5 3.1 4.4 5.0	900 1,100 800 1,700	2.1 4.2 2.9 4.3	400 400 400	.9 1.5 1.4 1.0	2, 100 1, 300 900 3, 700	4.9 5.0 3.3 9.3	11,200 4,000 4,500	26.3 15.3 16.4 15.0
By Annual Sales Size (from Food): \$100,000 or more \$40,000 to \$99,999 \$10,000 to \$39,999 Less than \$10,000 No reply V incloses drinking places, lunch counters, and refr	15, 300 24, 800 62, 600 91, 600 13, 800	100.0 100.0 100.0 100.0	4,600 3,000 2,700 1,500 1,100	12.1 4.3 1.6	5,900 10,000 9,900	23.8 16.0 10.8	2,500 11,200 32,400 38,300 5,400	45.2 51.8 41.8	400 1,100 3,000 4,800 700	5.2	100 100 2,300 4,600 600	3.7 5.0	100 200 600 1,700 100	.7 .8 .9 1.9	1,000 800 2,500 7,000 700	3.2 4.0 7.7	1,400 2,500 9,100 23,800 3,600	10.1 14.5 26.0

According to the survey the availability of storage facilities for frozen fish and shellfish and the distance of the supplier from the public eating place are not the important factors which determine how frequently supplies of frozen fish and shellfish are ordered. One factor which may have an effect on deliveries is the number of days a week fish and shellfish are included on the menus. There is some indication that many public eating places still offer fish and shellfish meals on Friday only, while most of the larger restaurants offer fish and shellfish more often.

The survey is financed by funds made available under the Saltonstall-Kennedy Act of 1954.

Salmon

COLUMBIA SALMON STUDY PLANNED FOR IDAHO STREAMS: Idaho's fabulous Salmon River, the "river of no return," haunt of "mountain men" and hardy fishermen, "top of the stream" for part of the Columbia River salmon and steelhead trout, and upper limit of the vast \$23 million Columbia River salmon program, is due for special attention this year, according to Fred A. Seaton, Secretary of the Interior in an August 5 news release.

Initial funds up to \$200,000 for the improvement of the Salmon River and possibly the Clearwater River, for salmon and steelhead production, are available this year for expenditure on approved projects.

A preliminary survey of needed improvements on the Salmon will begin soon in cooperation with the Idaho Department of Fish and Game under the Columbia River



Fisheries Development program. This is a cooperative program with the States of Oregon, Washington, and Idaho.

At the present time there are no dams on the Salmon River which

interfere with the runs but one dam is under construction on the Snake River below the mouth of the Salmon River. This is at Ice Harbor, not far from where the Snake River joins the Columbia. There are possibilities, however, of major dams at the Lower Monumental, Little Goose, and Lower Granite sites, all below the mouth of the Salmon River.

On the Columbia River itself below the mouth of the Snake River is the recently-constructed McNary Dam, the proposed John Day Dam, The Dalles Dam now under construction, and the Bonneville Dam which has been in existence since 1938. On the Columbia, also, are Grand Coulee and Chief Joseph dams, 600 miles from the sea, too high for fish ladders or elevators. Chief Joseph marks the upper limit of the salmon run on the main river.

In 1949, when it was evident that dams constructed or proposed would seriously damage the salmon and sea-run trout fisheries, Congress authorized the current salmon program which, when completed, will include 30 hatcheries (seven of which are in existence and being remodelled), more than 30 fishways and numerous stream clearance projects. These developments are designed to hold salmon and steelhead production at the highest possible level, although maintenance of the current production of 32 million pounds annually will also depend on continued availability of upriver spawning areas.

Of the 30 hatcheries, 8 will be operated by the Fish and Wildlife Service, 13 by Oregon, and 9 by the State of Washington. The total cost of the entire program will be about \$23,000,000 of which \$11,451,000 had been made available by the Congress before July 1, 1956. Of this amount, Washington has been apportioned \$4,291,000; Oregon, \$3,404,000; and the Fish and Wildlife Service, \$3,756,000. For the 1957 fiscal year, \$1,400,000 is available for construction and \$1,250,000 for operation and maintenance.

Under the program the natural spawning beds, like those of the Salmon River and elsewhere, will be utilized to the fullest extent. Streams, which because of numerous natural obstructions have not supported salmon runs for years have been cleared and new runs established. Hatcheries supply young fish to supplement the natural spawning results and for the reestablishment of runs. Fish ladders have been installed over dams and waterfalls. Fish screens have been placed at irrigation headgates to prevent loss of downstream migrants. Similar activities now will be undertaken in Idaho streams accessible to salmon and steelhead trout.

Special problems relative to fish ladders and screens are being studied by biologists who are improving fishway design and developing electrical guidance apparatus which, when perfected, will increase the efficiency of the fishways and drastically cut the losses in downstream migrants. These studies are among regular and continuing Service programs in cooperation with the Corps of Engineers and the fisheries agencies of Oregon, Washington, and Idaho.



Saltonstall-Kennedy Act Fisheries Projects

AMERICAN FISHERIES ADVISORY COMMITTEE TO MEET IN CHICAGO: A special meeting of the American Fisheries Advisory Committee will be held on October 11 and 12, 1956, in Chicago, Ill. This meeting has been called because of the recent passage of the Fish and Wildlife Act of 1956, which provides, in part, for the extension of the Saltonstall-Kennedy Act on a permanent basis, and makes available annually hereafter the full 30 percent of the duties on imported fishery products, thereby removing the former \$3,000,000 annual expenditure limitation of these funds.



Shrimp

<u>DYEING LATEST AID IN TAGGING</u>: Shrimp with heads of pastel colors are not dreams nor are they passing fads or fancies for the biologists of the Institute of Marine Science of the University of Texas, working on a U. S. Fish and Wildlife Service research project, have discovered a safe, sure, easy, way of identifying shrimp for study.

The biologists have found that certain dyes introduced into a shrimp's body by hypodermic needle or food will color the head of the shrimp but will not color the edible portions. The dye persists in the heads for several months. Various colors can be used, with the hypodermic needle method of introducing dye into the shrimp providing the wider selection.

This solves a problem which has been hampering scientific studies of shrimp for decades. Because shrimp molt periodically as part of the process of growth, the usual methods of tagging have only been partially satisfactory.

The identification work is part of a study of the movements and migrations of shrimp populations, which in turn is part of a comprehensive study of shrimp now being conducted by the Fish and Wildlife Service with funds supplied by the Saltonstall-Kennedy Act of 1954.

Another part of the research is being done by Tulane University where the first comprehensive anatomical study ever to be made of shrimp is being pursued. A third study is being made on the structure and chemistry of shrimp tissues at the Texas A. and M. Marine Laboratory while still another project to determine the effects of various environmental factors on shrimp is being made by the Fish and Wildlife Service biologists at Galveston, Tex.

Shrimp is America's largest fishery in terms of ex-vessel value--more than \$70,000,000 a year--and most of the United States production is in the Gulf of Mexico. The purpose of the study, together with an enlarged statistical program, is to enable biologists and members of the fishing industry to maintain a watchful eye on the shrimp fishery in the interests not only of the more than 7,000 trawler owners and crews and the processors who depend upon shrimp fishing for a livelihood, but for millions of Americans who consider shrimp one of the finer foods.



South Atlantic Exploratory Fishery Program

GEAR RESEARCH ACTIVITIES BY M/V "GEORGE M. BOWERS" (Cruise 5): Gear research activities were the objective of a nine-day cruise of the Service's



The Service's research vessel George M. Bowers.

gear research vessel George M.
Bowers during the period July 23
to July 31. These operations featured the use of divers using
SCUBA gear, a controllable diving
sled, movie and still-recording
cameras, and underwater television in the shallower waters of
Little Bahama Bank adjacent to
Matanilla Shoal at 79 05' west
longitude and 27 20' north latitude.

During 16 diving operations emphasis was placed on observations of modifications to rigging of a 40-foot bottom trawl for use in experimental fishing operations on the bottom, off the bottom, and in midwater. By use of the diving sled it was possible to observe the

trawls from all angles at distances ranging from approximately 50 feet to actual physical contact. Photographic recordings of the gear in action were taken during varied weather and light conditions.

It was determined that with minimum modification to placement of floats, lead line, trawl doors, and towing legs this particular trawl design was easily adaptable to experimental fishing just off the bottom or for midwater use.

During operations with the underwater television vehicle, an evaluation was made of a new and classified Vidicon television camera tube. A preliminary analysis indicated approximately twice the photosensitivity for the new tube as compared to commercially available equipment.

Two schools of tuna were sighted at Matanilla Shoal July 28 and July 29. During periods when



Fig. 2 - Exploratory fishing personnel aboard the George M. Bowers preparing to dive with SCUBA gear to observe action of shrimp trawls being towed on the bottom.

lighting conditions were unfavorable to underwater operations, trolling was conducted at the 100-fathom contour. Seven blackfin tuna (Thunnus atlanticus) from 4 to 6 pounds each were taken. Gonad examinations revealed the female fish were nearly sexually mature.

The M/V George M. Bowers was scheduled to depart Miami August 14, 1956, for a 16-day experimental fishing cruise on the Tortugas shrimping ground. Principal objective will be to learn more of the occurrence and distribution of shrimp off the bottom and in midwater. On at least three previous cruises Service explor-

atory vessels have taken commercial species of shrimp when the trawl was not on the bottom. Fishing operation will be conducted with 40-foot commercial-scale gear modified for use off bottom and in midwater in bad bottom trawling areas.



Tuna

ALBACORE TUNA INVESTIGATION IN NORTH PACIFIC: The M/V Brown Bear, a University of Washington oceanographic research vessel sailed the latter part of July for a seven-week large-scale albacore tuna investigation in the off-shore waters of the North Pacific. State and Federal agencies are cooperating in this albacore research which is being coordinated by the Pacific Marine Fisheries Commission, an agency created by a compact between California, Oregon, and Washington in 1947.

Some of the objectives of the cruise are: (1) investigation of factors such as water properties and abundance of plankton and other potential fish foods which may have an influence upon the distribution of albacore and salmon; (2) detection of possible changes in the above factors which might occur during a period of a few weeks, (3) collection of further information on the outflow of diluted water from the Columbia River and the Juan de Fuca system; (4) determination of the distributional pattern of any albacore which might be sighted in the area under observation.

During the 5,300-mile cruise, scientists aboard the <u>Brown Bear</u> will make observations at approximately 50 oceanographic "stations." The cruise will consist of two parts, with a port of call at Astoria about August 4. During portions of both parts of the cruise, the vessel will be operating in conjunction with the U. S. Fish and Wildlife Service exploratory fishing vessel <u>John N. Cobb</u>.

Plans have been made to rapidly forward to the tuna fishing fleet any information regarding schools of tuna which might be encountered during the course of the study. The Brown Bear will attempt to maintain radio contact periodically with the commercial fishing vessels in the general area.

* * * * *

INDUSTRY-GOVERNMENT SALES PROMOTION PROGRAM: In response to requests from the Pacific Coast tuna industry, the Secretary of the Interior an-

nounced July 24 that the Fish and Wildlife Service was giving full support to a joint industry-Government sales promotion program designed to move the plentiful supplies of canned tuna into normal trade channels.

The nationwide program, which was set up to move big stocks of canned tuna rapidly, was directed toward both institutional and home-consumer markets and reached a climax during the period of September 13 through 22.



Due primarily to excellent fishing this spring and summer, normally a season of light production, record stocks of canned tuna are available at the lowest price in several years. National advertising by the tuna industry and the emphasis of the tie-in features of canned tuna aided tremendously in the sales effort.

The Fish and Wildlife Service aided the industry's promotional efforts through special work with schools, institutions, and food-trade groups. Informational and educational activities were increased in order to attract greater consumer attention,

The Department of Agriculture cooperated through use of the facilities of the Federal Extension Service and the Food Distribution and Information Divisions of the Agricultural Marketing Service. Canned tuna in oil was included on the list of plentiful foods during September.

Canned tuna is available in a number of varieties. The solid pack consists of tuna loins packed in oil; the chunk pack, as the name implies, is a pack of chunks in oil; the grated pack is the grated or shredded portion of the tuna loin; the flake pack is the broken or mixed segments of the loin. A number of speciality packs are also available, such as "tonno" consisting of solid-meat tuna packed in olive oil; baby food packs, and others. For the past several years a "dietetic" pack has been prepared for those persons who must avoid salt in their diets. Practically all of these varieties are available in white or light meat.

* * * * *

CANNERS PETITION FOR STANDARDS OF IDENTITY: The Department of Health, Education, and Welfare on July 18 was petitioned for standards of identity and fill of container for canned tuna by the National Canners Association along with 20 domestic canners of tuna. Accompanying the petition was information supporting the request and suggesting a proposed text for the standards.



United States Fishing Fleet Additions

A total of 89 vessels of 5 net tons and over were issued first documents as fishing craft in June 1956--29 more than in June 1955. The South Atlantic and Pacific areas led with 25 each, followed by the Gulf area with 17, and the Chesapeake area with 14, according to the U.S. Bureau of Customs.

Table 1 - U.S. Vesse						Table 2 - U.S. Vessels Obtain-
Fishing Craft, by Ar	eas, J	une 19	56 and	Compa	risons	ing First Document as
A	Ju	ne	Jan	-June	Total	Fishing Craft, by Tonnage,
Area	1956	1955	1956	1955	1955	June 1956
		(1	Number	r)		Net Tons Number
New England	1	3	9	10	18	5 to 9 42
Middle Atlantic	2	1	15	9	13	10 to 19 17
Chesapeake	14	9	43	24	54	20 to 29 14
South Atlantic	25	2	49	30	65	30 to 39 8
Gulf	17	13	55	48	103	50 to 59 1
Pacific	25	21	48	60	117	60 to 69 1
Great Lakes	-	3	2	5	9	100 to 109 1
Alaska	5	- 8	27	23	35	110 to 119 1
Hawaii	-	-	-	2	3	120 to 129 4
Winner Talanda					1	Total 80

Note: Vessels assigned to the various sections on the basis of their homeports.

In the first six months of 1956, 37 more vessels were

418

issued documents as fishing craft than in the same period of 1955.

1/ Includes both commercial fishing and sport fishing craft.

60

248



U.S. Foreign Trade

EDIBLE FISHERY PRODUCTS, APRIL 1956: Imports of edible fresh, frozen, and processed fish and shellfish for this April increased about 6.7 percent in quan-

tity and 1.1 percent in value as compared with March 1956. Compared with April 1955 the imports for April 1956 increased 17.1 percent in quantity and 20.4 percent in value. The dollar value in April 1956 was close to 26.4 cents a pound, compared with 25.7 cents a pound in April 1955. The increases for April 1956 over the same month a year ago were due largely to higher imports of frozen fish fillets and canned fish.

Exports of processed fish and shellfish in April 1956 decreased about 40 percent from the March 1956 total, and were also down 58 percent from April 1955. The value of exports in April 1956 declined 38.5 percent when compared with March 1956 and 69 percent below April 1955.

	United States Fore	ign Tra I 1956				ery Pr	oducts,
			Quant	tity		Valu	ie
	Item	Apr	il	Year	Ap	ril	Year
		1956	1955	1955	1956	1955	1955
		(Mill	ion of	Lbs.)	(Mi	llions	of \$)
	Imports:		1				
	Fish & Shellfish:						
-	Fresh, frozen &						
	processed1/	67.0	57.2	768.3	17,7	14.7	206,4
	77						
	Exports:						
	Fish & Shellfish:						
	processed1/						
	only (excluding						
	fresh & frozen)	3,8					21.8
	1/ Includes pastes,		s, clar	n chow	der a	nd juic	ce, and
e	other specialti	es.					
5							

* * * * *

lion pounds--27 percent greater than in the corresponding month of last year (see chart 7 in this issue). The principal cause for this gain was a 4.6-million-pound in-



crease in imports from Canada, Imports from Norway, Denmark, and Miquelon and St. Pierre were also somewhat greater. Icelandic groundfish fillet exports to the United States during July 1956 were down 1.5 million pounds as compared with exports reported for the preceding July. There were no imports from Sweden, United Kingdom, France, Japan, and the Union of South Africa during July 1956.

Canada continued as the chief exporter of groundfish fillets to the United States with 14.7 million pounds during July 1956--92 percent of the

total fillet imports. Canada accounted for 80 percent of the groundfish fillet imports during the same month of 1955.

Total groundfish and ocean perch fillet imports during the first seven months of 1956 amounted to 82.6 million pounds -- an increase of 7.4 million pounds or 10 percent as compared with the amount reported for the same period last year. Canada (59.5 million pounds) and Iceland (15.5 million pounds) led all other countries during the seven-month period of 1956--both accounting for 91 percent of the total.

IMPORTS AND EXPORTS OF SELECTED FISHERY PRODUCTS, JANUARY-MAY 1956: A comparison of United States imports and exports of selected fishery

United States Foreign Trade January-Ma			ry Products,
	1956		Percentage Increase or Decrease
IMPORTS:	(1,00	0 Lbs.)	2
Tuna, fresh or frozen	58,900	65, 158	- 10
Tuna, canned	13,824	11,765	+ 18
Bonita, canned	6,801	7,703	- 12
Salmon, fresh or frozen	1,566	4,070	- 62
Salmon, canned	10,480	1,038	+910
Sardines, canned	8,458	8,638	- 2
Shrimp	26,123	16,645	+ 57
Lobsters, fresh or frozen .	20, 332	20,420	1/
Crab meat, canned	1,979	1,273	+ 55
Groundfish fillets	41,940	30,026	+ 40
Groundfish blocks and slabs	13,503	23, 206	- 42
Swordfish	7,759	8,011	- 5
EXPORTS:			
Salmon, canned	662	4,307	- 85
Sardines, not in oil, canned	20,676	19, 105	+ 8
Fish oils, inedible	45,995	43,624	+ 5
1/ A decrease of less than one-half percent,			

products during the first five months of 1956 with the same period of 1955 shows substantial gains in imports of canned tuna, salmon, and crab meat; fresh and frozen shrimp, groundfish fillets; and fish meal. There were declines in imports of canned bonito, fresh or frozen tuna, salmon, and blocks or slabs of groundfish fillets.

Principal changes shown in exports were increases incanned sardines and fish oil and a decline in canned salmon.

Fish meal imports during January-May 1956 of 51, 167 tons were 7 percent higher than the 47,967 tons for the same period a year earlier.

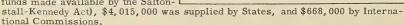


United States Governmental Expenditures in Fiscal 1956 for Fishery Research

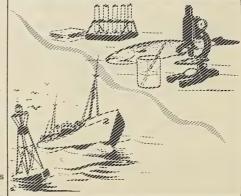
United States and state agencies and international fisheries commissions spent \$13,975,000 in the fiscal year ending June 30, 1956, on research and services for commercial fisheries, according to a report released August 2 by Secretary of the Interior Fred A. Seaton.

Categories considered in the report include expenditures for biological research, hatchery and river basin studies, exploratory fishing and gear research, technological studies (refrigeration, utilization of products, etc.), collection and publication of statistics and market news data, economic studies, market development and education activities, and various other types of research and services.

Of this total expenditure, \$9,292,000 was from regular Fish and Wildlife Service appropriations (\$2,811,000 of which was from funds made available by the Salton-



Of all the funds spent on fishery research, the report shows that \$4,733,000 was spent in salmon research and services; tuna activities got \$1,504,000 of which



\$1,386,000 was spent on the Pacific fishery; oysters got \$1,068,000 of which \$984,000 was spent on Atlantic and Gulf of Mexico problems; for sardines \$1,184,000 was spent with \$957,000 going to the Pacific; while \$613,000 was spent on the Atlantic and Gulf of Mexico shrimp fishery. The menhaden and halibut fisheries each got \$245,000. Research and services for all varieties of fresh-water fish amounted to \$917,000. The remainder of the funds were distributed among numerous other fish including rockfish, flounders, ocean perch, mackerel, mullet, striped bass, scallops, clams, crabs; and northern lobsters.

More than half of the \$4,015,000 supplied by States went to three varieties of fish: salmon research and development work getting \$983,000, eastern and southern oyster projects receiving \$706,000, and \$638,000 for work on the Pacific sardine.

Funds of the international fisheries commissions were distributed in the interests of three fisheries: salmon, \$282,000; tuna, \$198,000; halibut, \$188,000.

The annual catch of fish varies from year to year but approximates 4.5 pounds. The value of the catch also varies but it approximates \$350 million a year.

The report puts shrimp in first position in value of the catch at the boat, third at the level of the processor and primary wholesaler, and second at the retailer level. Tuna ranks first for the processor and primary wholesaler, first for the retailer, and second for the fisherman and boat owner. Salmon is second for the processor and primary wholesaler, third for the retailer, and third for the fisherman and boat owner.

As far as volume is concerned, menhaden is far ahead with a catch of about 1.7 billion pounds annually, or about 38 percent of the total catch. Menhaden, which is used for meal and oil, ranks in sixth, seventh, and ninth positions in value, respectively, to the processor, fisherman and boat owner, and retailer.

Alaska is first among the states and territories in number of fishermen with 14,000 out of a total of 153,000. California heads the list of fishing craft in operation with more than 10,000 out of a total of about 87,000 craft. California, Massachusetts, and New Jersey are rated one, two, three in volume of catch; California, Massachusetts, and Florida are one, two, three in the value of the catch.

The report, <u>Major Commercial Fisheries</u> with <u>Data</u>, on <u>Research</u> Expenditures, Fishery Leaflet 435, may be obtained from the Division of Information, Fish and Wildlife Service, Washington 25, D. C.



U. S. Production of Fishery Byproducts, 1955

FISH MEAL AND SCRAP: Production of fish meal and scrap in the United States and Alaska during 1955 amounted to 264 thousand tons. Compared with the production reported for 1954, this was a 3-percent increase. The largest production recorded for a single month during 1955 was in July when nearly 53 thousand tons were processed (table 1).

Table 1 - U. S. Production of Ma	rine-Animal	Scrap and	Meal, 1955 ar	d 1954
Product	19	55	19	954
1 Todaet	Quantity	Value	Quantity	Value
	1,000 Short Tons	\$1,000	1,000 Short Tons	\$1,000
Meal and Dried Scrap:				
Alewife	0.3	43.2	-	-
Anchovy	0.2	29.9	0.2	25.4
Crab, blue	8.1	445.2	10.1	598.1
Crab, dungeness	. 2	9.2	0.2	10.3
Fur seal	0.3	19.6	0.3	33.5
Groundfish ("white fish")				
incl. ocean perch	6.1	815.5	7.2	934.6
Herring	7.7	1,163.5	7.0	928.9
Menhaden	190.6	25,449.3	183.1	23,783.4
Sardine (Pilchard)	7.0	968.9	6.5	842.6
Salmon	0.7	88.6	1.2	137.5
Shrimp	0.5	34.3	0.9	50.3
Tuna and Mackerel	23.4	3,120.3	21.5	2,845.2
Unclassified	19.2	2,542.2	18,7	2,558.0
Total	264.3	34,729.7	256.9	32,747.8

MARINE ANIMAL OIL: The total yield of fish oils during 1955 amounted to 24.8 million gallons, compared with 21.5 million gallons for the preceding year (table 2).

Table 2 - U. S. Production of Fish Oils, 1955 and 1954										
Table 2 - U. S. Fi										
Product	19			954						
Troduct	Quantity	Value	Quantity	Value						
	1,000 Gals.	\$1,000	1,000 Gals.	\$1,000						
Body Oil:										
Anchovy	16.1	9.3	9.3	5.0						
Fur seal	40.5	26,4	40.2	19.9						
Herring	1,091,0	668.7	760.9	434.3						
Menhaden	21,115.2	12, 131.8	18,641.4	9,755.3						
Sardine (Pilchard)	897.7	521.6	755.9	420.5						
Salmon	145.6	91.7	183.0	141.9						
Tuna and Mackerel	544.9	264.2	584.9	243.5						
Unclassified	710.9	502.5	652.4	393.1						
Total	24,561.9	14, 216.2	14, 216.2	11,413.5						
Liver and Viscera Oil:										
Cod	148.9	129.6	161.5	133.8						
Shark	47.2	176.7	26.3	298.4						
Migrallandoug	22.7	282.4	48.9	959.7						
Total .	218.8	588.7	236.7	1,391.9						
		14, 804, 9		12, 805. 4						
Grand Total	24, 780. 7	14, 804. 9	21,004.1	12,000.4						

CONDENSED FISH SOLUBLES AND HOMOGENIZED CONDENSED FISH: The production of condensed-fish solubles during 1955 (157.1 million pounds) was 9 percent blow 1954. The homogenized-condensed fish production during 1955 totaled 41.2 million pounds, compared with 47.1 million pounds the preceding year (table 3).

Table 3 - U. S. Production of Condensed Fis			nogenized-	
Product and State	1	955	1	954
Froduct and State	Quantity	Value	Quantity	Value
	1 Million Pounds	\$1 Million	1 Million Pounds	\$1 Million
Fish Solubles:				
Maine, Massachusetts, Rhode Island	14.1	0.5	9.9	0.5
New York, New Jersey, Delaware .	62.1	2.1	64.7	3.1
Virginia	3.1	0.1	20.7	1.1
North Carolina, Florida	6.9	0.3	7.3	0.4
Mississippi	10.2	0.4	5,5	0.3
Louisiana, Texas	15.4	0.6	13.1	0.6
California, Oregon	45.3	2.0	51.0	2.3
Total	157.0	6.0	172.2	8.3
Homogenized-Condensed Fish: Massachusetts Rhode Island	41 2	1.5	57.9	2.3



Wholesale Prices, July 1956

The usual mid-season lull in landings and production was responsible for the higher prices in July for most edible fresh and frozen fishery products. The July 1956 over-all wholesale index (114.6 percent of the 1947-49 average) for all edible fish and shellfish (fresh, frozen, and canned) rose 4.5 percent over the previous

month and 10.7 percent over that

Grand Total

for July 1955.

Although weather conditions were ideal in all fishing areas, fish were scarce, particularly in the North Atlantic. Lighter landings for fresh haddock at Boston and the evenly-distributed landings of halibut on the Pacific Coast caused the prices for these products to go up considerably from June to July 1956, and these products were priced substantially higher than in July 1955. Salmon prices dropped slightly from June to July 1956 because of more liberal landings on the Pacific Coast. Among the fresh-water fish, July



Trawlers unloading at the Boston Fish Pier.

1956 whitefish prices were lower because supplies were fairly plentiful, but lake trout and yellow pike prices were higher because catches were light. The drawn, dressed, or whole finfish subgroup in July 1956 was 15.2 percent higher than the previous month and 22.6 percent higher than in the same month a year earlier.

There were only slight changes in the prices for processed fresh fish and shellfish between June and July. Lower prices for fresh shrimp at New York were more than offset by substantially higher prices for fresh haddock fillets at Boston. However, both of these products in July 1956 were priced considerably higher than in July a year ago. Shrimp landings in the South Atlantic were moderate to liberal.

The July 1956 index for the fresh processed fish and shellfish subgroup was only 0.7 percent higher than the previous month, but 19.1 percent above the same month in 1955.

Higher prices for frozen shrimp at Chicago, because of excellent demand, accounted for the 5.0-percent increase in the subindex for processed frozen fish and shellfish from June to July 1956. Higher prices for nearly all items in the subgroup were responsible for the 10.3-percent increase in this subindex from July 1955 to July 1956. Only frozen ocean perch fillet prices dropped from June to July because of liberal stocks.

Table 1 - Wholesale Average Prices and Indexes for Edible Fish and Shellfish, July 1956 With Comparisons										
Group, Subgroup, and Item Specification	Point of Pricing	Unit	Avg. F	rices1/		Inde (1947-	xes 49=100)			
			July 1956	June 1956	July 1956	June 1956	May 1956	July 1955		
ALL FISH & SHELLFISH (Fresh, Frozen, & Canned)					114,6	109.7	111.7	103,5		
Fresh & Frozen Fishery Products: 125,9 117.5 120.6 106.3 Drawn, Dressed, or Whole Finfish; 122,5 106.3 113.3 99.9										
	Boston	1ь.	.091	.06	92.2	56.3	70.9	57.4		
Halibut, West., 20/80 lbs., drsd., fresh or froz.	New York	lb.	.40	2/.34	122.2	107.3	123.8	90.8		
Salmon, king, Ige, & med., drsd., fresh or froz.	New York	1b.	.64	.64	142.7	144.4	140.5	130.3		
Whitefish, L. Superior, drawn, fresh	Chicago	1b.	-48	.53	119.0	131.4	153.7	81.8		
Whitefish, L. Erie pound or gill net, rnd., fresh	New York	1b.	65	.69	131.4	139.5	148.6	131.4		
Lake trout, domestic, No. 1, drawn, fresh	Chicago	1b.	.60	.58	122.9	117.8	104.5	93.2		
Yellow pike, L. Michigan & Huron, rnd., fresh	New York	1b.	.54	.34	126.7	78.6	68.0	161.8		
Processed, Fresh (Fish & Shellfish):					128.6	127,7	126,1	108,0		
Fillets, haddock, sml., skins on, 20-lb. tins	Boston	1b.	.33	.25	112.3	85,1	91.9	78.3		
Shrimp, lge. (26-30 count), headless, fresh	New York	lb.	.80	.82	126.4	129.3	124.8	105.9		
Oysters, shucked, standards	Norfolk	gal.	5,50	5.50	136.1	136,1	136.1	117.5		
Processed, Frozen (Fish & Shellfish):					117.7	112.1	115.2	106,7		
Fillets: Flounder, skinless, 1-lb. pkg	Boston	1b.	.39	27.39	102.1	102.1	103.4	102.1		
Haddock, sml., skins on, 1-lb. pkg	Boston	1b.	.28	.28	86.3	86.3	91.0	83,2		
Ocean perch, skins on, 1-lb, pkg	Boston	1b.	.27	.28	109.8	110.8	114.8	106.7		
Shrimp, lge. (26-30 count), 5-lb. pkg	Chicago	1b.	.82	.75	126,6	116.1	118.1	108.8		
Canned Fishery Products:					98.7	98.7	99.0	99,2		
Salmon, pink, No.1 tall (16 oz.), 48 cans/cs Tuna, lt, meat, chunk, No. 1/2 tuna (6-1/2 oz.),	Seattle	cs.2	/22.65	2/22,65	120.0	120.0	120.0	109.6		
48 cans/cs	Los Angeles	cs.	10.60	10.60	76.4	76.4	76.4	92.3		
Sardines, Calif., tom. pack,No. 1 oval (15 oz.), 48 cans/cs.	Los Angeles	cs.	7,50	7,50	87.5	87.5	87,5	88.1		
Sardines, Maine, keyless oil, No. 1/4 drawn (3-1/4 oz.), 100 cans/cs	New York	cs.	8,20	8,20	87,3	87.3	89.9	71,3		

^{1/}Represent average prices for one day (Monday or Tuesday) during the week in which the 15th of the month occurs. These prices are published as indicators of movement and not necessarily absolute level. Daily Market News Service "Fishery Products Reports" should be referred to for actual prices.

Canned fishery products prices remained unchanged from June to July 1956 and were only 0.5 percent lower than in July 1955. In July 1956 the canned tuna pack was greater than for the same period a year earlier, and the same was true for the canned Maine sardine and canned salmon packs. However, the good demand for nearly all canned fishery products accounted for the steadiness in prices. Prices in July 1956 as compared with the same month in 1955 were substantially higher for canned salmon and Maine sardines but were almost offset by the lower prices for canned tuna and California sardines.

... X.

Note: The canned salmon price shown in the index for January, February, March, April, May, and June (Commercial Fisheries Review: March 1956, p. 25; April 1956, p. 27; May 1956, p. 34; June 1956, p. 51; and July 1956, p. 55; respectively) was incorrect and should have been \$22,65 a case. However, the canned index for each of these months was not affected and was correct as shown.



International

INTERNATIONAL PACIFIC HALIBUT COMMISSION

AREAS 3A AND 3B CLOSED AUGUST 24: The closure of the first fishing season in Pacific halibut Areas 3A and 3B was set for August 24 (6 a.m. P.S.T.), according to an announcement of August 6 by the International Pacific Halibut Commission. The Comission estimated that by August 24 the catch limit of 28 million

pounds for Area 3A would be reached. There is no catch quota for Area 3B, but that area closes on the same date as Area 3A

The official opening date for all halibut fishing in the Pacific regulatory areas this year was May 12 (6 a.m. P.S.T.), but fishing did not commence until May 20 because of a voluntary delay agreed upon by all United



Halibut,

States and Canadian halibut fishermen.

Areas 3A and 3B this year were open to fishing for 104 days—the longest season for those areas since 1947 when the season lasted for 109 days. For the last few years the trend has been towards a shorter season. However, this year fishing in those areas lasted longer because (1) fishing started 8 days later than the opening date established by the Commission, (2) most vessels voluntarily agreed to remain idle for 7 days after each trip, (3) there were a few days of inclement weather on the fishing grounds, and (4) fish were scarce in certain popular fishing sections. In view of the fishermen-agreed 8-day delay of the opening date, actual fishing in Areas 3A and 3B was possible for only 96 days. In 1955, Areas 3A and 3B were open to fishing for 81 days as compared with 58 days in 1954, 52 days (shortest on record) in 1953, 60 days in 1952, 56 days in 1951, 66 days in 1950, 73 days in 1949, and 72 days in 1948.

This year, according to the regulations, the second fishing season of 7 days in Areas 2 and 1B was scheduled to begin at 6 a.m. P.S.T. September 9 (16 days after the end of the first season in Area 3A, which was announced as August 24). The second fishing season was scheduled to end at 6 a.m. September 16, unless a later termination date was announced.

The second fishing season of 9 days in Areas 3A and 3B was scheduled to begin at the same time as that for Area 2, but was scheduled to end at 6 a.m. September 18 unless a later termination date was announced.

A third fishing season of 23 days in Area 3B only was scheduled to begin at 6 a.m., September 30 (12 days after the end of the second fishing season for that

area) and end at 6 a.m. October 23, 35 days after the end of the second season. In the event the Commission announces a date later than September 18 for the end of the second halibut fishing season in Areas 3A and 3B, the opening and closing dates of the third season in Area 3B shall be changed accordingly.

Area 1A, which has been open continuously to halibut fishing since May 12 is scheduled to close at 6 a.m. on the same day that the third halibut fishing season in Area 3B shall end.

After the termination of the last of the fishing seasons in each area, that area shall be closed to halibut fishing until it is reopened in 1957.

Area 1A includes the waters south of Heceta Head, Ore.; Area 1B, the waters between Heceta Head and Willapa Bay, Wash.; Area 2, the waters between Willapa Bay and Cape Spencer, Alaska; Area 3A, the waters between Cape Spencer and the Shumagin Islands off the coast of Alaska; and, Area 3B, the waters west of Shumagin Islands and in Bering Sea.

NORTHWEST ATLANTIC FISHERIES COMMISSION

REPORT ON ANNUAL MEETING: The Annual Meeting of the International Commission for the Northwest Atlantic Fisheries convened at Commission headquarters in Halifax, Nova Scotia, June 11-15, 1956. The Annual Meeting was preceded by meetings of the Committee on Research and Statistics on June 8-9.

All ten countries were represented at the meeting. West Germany and the U.S.S.R. were represented by observers. The Commission would probably hold its next meeting in Lisbon on May 20, 1957.



Substantive questions of the Commission's recommendations for mesh-size regulation in Subareas III, IV, and V were of principal concern. Of the recommendations made by the Commission at its meeting in Ottawa in June 1955, only that for Subarea V, which involved minor amendments to the existing regulation, had received complete acceptance by the governments in the panel involved. The recommendations for $4\frac{1}{2}$ -inch mesh in Subarea IV and 4-inch mesh in Subarea III had been objected to by the French Government. The French Government had no objection to the mesh size in itself but found it impossible to accept the provision which restricted the use of chafing gear.

This objection stemmed from the fact that French trawlers operating in the Northwest Atlantic fished at great depths, and the French found it necessary to use double and sometimes triple cod ends in order to prevent the gear from bursting when brought to the surface. This question was discussed thoroughly during the Commission's meeting and the French Commissioners agreed that an investigation should be undertaken immediately by French scientists to find ways of strengthening the gear so that double and triple cod ends would not be necessary. The United States, United Kingdom, and Canada all agreed to cooperate with and assist the French Government to the greatest extent possible in this study. After some further discussion of the problem, the French Commissioners agreed to vote for an amendment to the regulations for Subareas III and IV, which would place the restrictions on chafing gear in abeyance until July 1, 1957. At that time they would go into effect automatically unless the French Government notified the United States of its continued objection. It was the hope of the Commission that this amended regulation could be brought into effect by January 1, 1957. If so, on that date the use of $4\frac{1}{2}$ -inch mesh in Subarea IV and 4-inch mesh in Subarea III would be required, but there would be no restriction on the use of chafing gear. It was the further hope of the Commission that

by the first of July 1957 the French Government would have solved its problem and be prepared at that time to accept the limitations on chafing gear. This proposed



Delegates, advisers, observers, and staff members of the Sixth Annual Meeting of the International Commission for the Northwest Atlantic Fisheries, Halifax, N. S., June 1956.

amendment to the regulations for Subareas III and IV was adopted by the Commission for transmittal to the governments for their final approval.

The question of the ten-percent annual exemption which the United States Commissioners proposed to the Commission met with considerable resistance, particularly from the United Kingdom because of the damaging precedent which that Government felt the exemption would establish in the North Sea and the Northeast Atlantic and from Canada because that Government felt that the administrative problems connected with such an exemption were insuperable. After much discussion, it was agreed that the ten-percent exemption might be adopted as an experiment in Subarea V only for a period of two years. If, at the end of one year, there was evidence that a ten-percent exemption permitted large numbers of small haddock to be taken, the percentage might be reduced. In any event, the results of the experiment would be reviewed by the Commission at the end of two years to determine whether or not it was successful and the ten-percent annual exemption might be adopted permanently.

The Standing Committee on Research and Statistics reported considerable progress was being made in tagging, in the standardization of methods of measuring fish, and in the coordination and research on cod, ocean perch (redfish), halibut, and haddock.

Iceland asked for a panel membership in Panel 1. The application was approved by Panel 1 and accepted by the Commission.

An application by United Kingdom for panel membership in Subarea 4 was, after some discussion, withdrawn by that delegation.

The question of the Italian membership in Panels 1, 2, 3, and 4 was considered. The Italian delegates stated that they had proposed to the Italian Government that it inform the Commission before the end of June 1956 if any changes were wished. Further action was deferred.

The Committee on Research and Statistics opened its session this year on June 8 by continuing study of the Commission's research needs which it had begun at Biarritz, France, in March. Its principal point of reference was the list of recommendations which the working parties of experts had made regarding gaps in knowledge that must be filled in order to carry out the Commission's functions. To fill these gaps requires a comprehensive research program throughout the Convention

Area. Such a program is beyond the capacity of any one member of the Commission; it must be carried out by all members closely collaborating in designing the work, coordinating the operations, and integrating the interpretations. Such collaboration is the principal function of this Committee and is the purpose of interim meetings such as that held at Biarritz.

Taking a long view of the research needs of the Commission, it will be necessary for all of the members to increase their support of research. The amount of increase which each country should plan must depend on its present expenditures for fishery research in the area and on the volume of fish which it harvests. During this year's session, the Committee outlined research programs dealing with cod, haddock, ocean perch, and halibut, and with several subjects that apply to all species, namely population dynamics, causes of natural mortality, and techniques of fishery research. These programs, which are appended to the report on the Biarritz meeting, are laid down as a guide for future planning, not as a prescription for full, immediate action. The Committee urges the Commission members to foster the orderly increase of support for fishery research in their respective countries as rapidly as feasible, beginning immediately by taking the essential first step of making provision for adequately sampling their fisheries at sea and also ashore.

Panel 1 met once. The Commission noted the Panel's statement that all countries should carry out samplings of their commercial catches and report these to the Secretariat for compilation, and that hydrographic data should be reported to the Secretariat in table form; further that the Panel considered the cooperation with ICES as to hydrographic reporting satisfactory, and agreed that the generous offer of the International Ice Patrol to furnish ICNAF with data on their sections in Subarea 1 should be gratefully accepted. The Commission noted with satisfaction the progress in research work in the area, especially as to cod and halibut.

Panel 2 met twice. The Commission noted that Portugal had initiated samplings of its cod catches in Subarea 2, that Canada hoped to do so in the future, and that this country had continued its explorations for ocean perch in the Hamilton Bank Area.

Panel 3 met once. The Commission noted with gratification that the Spanish researches on haddock had been developed considerably and that Portugal had initiated extensive samplings from its cod fishery in the Subarea. The Panel discussed the proposed mesh regulations, especially the French reluctance to accept the method of mesh measuring and the clauses as to chafing gear. Otherwise France had accepted the regulations, which in their entirety had been accepted by all other member countries. The question of the clauses on chafing gear were referred to the new ad hoc committee.

Panel 4 met once. The Commission noted that the United Kingdom had withdrawn its application for a panel membership in view of the lack of substantial exploitation. It was further noted that Portugal had commenced samplings of its commercial cod catches, and that joint researches by Canada and the United States regarding haddock were carried out. For France the same problems as to the trawl regulations were found in Subarea 4 as in 3; the problems were considered by the Panel and also in the joint panels' meeting.

Panels 3 and 4 met jointly to consider the problems of mesh proposals and of chafing gear for Subareas 3 and 4.

Panel 5 met twice. The Commission noted that the United States was facing minor difficulties in continuing the small mesh study boat program, but that the panel had agreed that this important study had to be continued.

The United States proposal to amend the present exemption of the haddock regulation to allow a 10 percent per annum exemption was considered. It was agreed that a series of questions had to be answered before a decision could be taken. These questions were formed and referred to the Committee on Research and Statistics. It was agreed that part of these questions, especially as to enforcement, were hardly within the province of the standing committees.

Therefore the Panel proposed to the Plenary to establish another committee for such problems, and the Plenary appointed an ad hoc committee to deal with any such problems.

GREAT LAKES FISHERIES COMMISSION

FIRST MEETING HELD: The Great Lakes Fisheries Commission met at Sault St. Marie, Ontario, July 30 and heard reports from United States and Canadian researchers working on the sea lamprey problem, states the July Official News Bulletin of the Michigan Department of Conservation.

Ann Arbor, Michigan, has been named the official headquarters for the Commission, an international six-member board recently set up to help fisheries research and to guide sea lamprey control on the Great Lakes.

Lampreys have devastated certain fish populations in the Great Lakes. Electrical weirs are blocking many rivers emptying into the Great Lakes to prevent lampreys from spawning. Also, certain chemicals have been found to kill young lampreys living in upriver mud and gravel banks.

At present, 97 weirs are in operation on Lakes Superior, Michigan, and Huron; 55 more are scheduled for construction on Lake Michigan streams and 10-26 on Lake Superior streams this year. Others will be built on other lakes in the next few years so that barriers will block all rivers on all the Great Lakes by the end of 1960.

The Commission was to hold its next meeting in Ann Arbor in mid-August and called its statutory annual meeting for late November 1956.

INTERNATIONAL LAW COMMISSION

INTERNATIONAL CONFERENCE SUGGESTED TO SETTLE BREADTH OF TERRITORIAL WATERS: The International Law Commission after five years of discussions voted in June 1956 to make no decision on the breadth of territorial waters within a limit of 12 miles, reports The Fishing News (June 15, 1956), a British fishery periodical. The Commission suggested that the subject should be settled by an international conference.

The Commission, who began its work in 1951, is preparing a draft report on The Regime of the High Seas for approval by the next session (November 1956) of the United Nations General Assembly.

The draft recognizes that "International practice is not uniform as regards the delimitation of the territorial sea;" and that, though many states have fixed a breadth greater than three miles, "many states do not recognize such a breadth when that of their own territorial sea is less."

Britain, the United States, and the Soviet Union were amongst the majority of nine who, believing that only an international conference could settle the matter, considered it advisable to go no farther at this stage than to lay down that: "The Commission considers that international law does not permit an extension of the territorial waters beyond 12 miles."

Before the vote was taken, Britain's representative stated that Britain had always championed the three-mile limit and declared that any extension above this figure would upset the balance of the Commission's work and some countries would have seriously to reconsider their position.

He pointed out that the Commission had already granted coastal states the right to take unilateral action to protect fisheries outside their territorial waters and, if further concessions were granted regarding the territorial sea, some states might well start claiming the continental shelf as well.

The Commission has still to complete its examination of the question of straight base lines where a coast is deeply indented.

For some weeks the International Law Commission, which consists of 15 legal experts from different countries, has been meeting in Geneva and discussing the codifying and developing of international law. The Commission approved the following text submitted by Greece's representative:

- "(i) The Commission recognizes that international practice is not uniform as regards the delimitation of the territorial sea.
- "(ii) The Commission considers that international law does not permit an extension of the territorial sea beyond 12 miles.
- "(iii) The Commission, without taking any decision as to the breadth of the territorial sea within that limit, notes, on the one hand, that many states have fixed a breadth greater than three miles and, on the other hand, that many states do not recognize such a breadth when that of their own territorial sea is less.
- "(iv) The Commission considers that the breadth of the territorial sea should be fixed by an international conference."

During the discussion of draft articles on fisheries at Geneva, an amended article was proposed by Judge Edmonds (U.S.) which said that where the yield of fish was dependent on the conservation program being carried on by the state or states whose nationals were substantially fishing such stocks, states not so fishing or which had not done so within a reasonable period of time, excepting the coastal state adjacent to the waters in which this stock was found, should abstain from fishing such stock.

Judge Edmonds described his proposal as a progressive step in the development of international law, reports a Geneva correspondent. Judge Edmonds was supported by Dr. P. Nervo (Mexico) who spoke of "the justified exclusion of third parties by abstention."

Sir Gerald Fitzmaurice (U.K.) pointed out that the principle might violate the doctrine of nondiscrimination enshrined in the Commission's draft. Mr. Francois (Netherlands), the special rapporteur, strongly approved the principle, which he said could hardly be regarded as a victimization of newcomers to fishing grounds. The Commission agreed with the chairman's view that the question should be taken up when the Commission dealt with the whole matter of exclusive rights in certain areas of the high seas.

FOOD AND AGRICULTURE ORGANIZATION

WORLD MARINE RESOURCES SURVEY MAY SUPPLY KEY TO FUTURE: Marine biologists of many nations employed by the Food and Agriculture Organization are engaged on complex work of collecting, sorting, analyzing, codifying, and recording by decimal classification, facts and information about the oceans, seas, rivers, and inland waters of the world.

These men are engaged on a task which will take many years to complete—a survey of the living aquatic resources of the world. It is a task which relates to the activities of the Member Governments of the 72 nations of FAO, and of marine biologists, and of fishery scientists studying the world's fisheries, as well as fishermen themselves. Ultimately, this resources survey, of

which FAO acts as a clearing house and stimulator, not an originator, may determine the future welfare of fisheries

throughout the world.

"Fisheries are still in a primitive state as compared with, say, farming," said Dr. G.L.Kesteven, Chief of the Biology Branch, Fisheries Division, FAO, who is in charge of the Organization's work on the survey. "The ultimate aim in fisheries is to conduct the industry with the same efficiency and certainty which now exists in agriculture, although, of course, we can never hope to 'farm,' as it



were, all the oceans and seas. But we need to practice fish husbandry to the fullest extent within the limits possible. We need to manage, control, and breed fish as a farmer manages, controls, and breeds animals so that we can cultivate fish, whether at sea or in fresh water, for the benefit of mankind, that is to say, breed them for our purpose, pasture them as we do animals, and harvest them for food or commercial purposes as we do sheep or cattle.

"At the present time we are a great distance from such a goal," he continued, "although Governments have made the first tentative steps in that direction through the introduction of fishery controls such as closed seasons for catching certain fish and regulations concerning the size of nets to be used, and have, as in the case of whales, restricted the quantities that may be caught in one season."

The problem of management, control, and development of fisheries, is complicated by a number of factors. First, no individual or nation has property rights over the oceans and seas or the life in them. Even the extent of ownership of territorial waters is in dispute. Second, about 75 percent of the earth's surface is covered by water and knowledge of the life and resources of this vast area is limited. Third, the knowledge that does exist of well-known and exploited sea fisheries is inadequate for rational management on a national or international scale.

"According to statistical information available, only about 10 percent of animal protein food consumed by man comes from the waters of the world," said Dr. Kesteven. "Our present knowledge of resources indicates that we could gather much more food from this source and also use much greater quantities of sea products for commercial purposes. For example, Dr. Woodward of the United Kingdom, estimates that there are 10 million tons of brown seaweed available around Scotland and one million tons could be harvested each year to produce 70,000 to 110,000 tons of carbohydrate. He has also estimated that there are 60 million tons of such weed growing on the coasts of Norway, France, the British Isles, Canada, and the Falkland Islands. This is only one example of aquatic flora which could be used by man and, as always when one talks about marine life, the figures run into astronomical dimensions."

Fish and aquatic mammals are at the end of the food chain in the sea, but there are intermediate stages in this chain which might be of commercial value. Zooplankton is an example. This minute growth is a basic food for many creatures in the sea. Whales, for example, consume millions of tons of it. Man can use zooplankton and in Asian countries great quantities are used in the manufacture of pastes and other fishery products. Attempts have been made by governments of western countries to use zooplankton industrially but with little success so far.

"I mention these in passing to indicate that any survey of marine resources is concerned with much more than fish," explained Dr. Kesteven, "although, naturally, mankind is more directly interested in the food he can get for immediate consumption, that is to say, fish. We have gathered much more knowledge about the available commercial fish but before we can reach a point of conducting fish husbandry we need to know a tremendous lot more. What we do know has led to some conservation measures being taken as, for instance, in the North Sea where it has been recognized that unrestrained overfishing might lead to gross depletion of stocks. Fishery biologists believe that, through international agreement at government level and through other control and conservation activities, the yield of fisheries can be maintained at a determined level but we need full knowledge of all the factors involved before we can attain such results.

"Another practical result from a world survey of marine resources would be the discovery of the nature and extent of stocks in relatively unexploited grounds, of new grounds, and, perhaps, the commercial uses for trash fish or species which are not now considered to be of any value."

The discovery in recent times of new resources of fish and crustacea indicates that the oceans contain much unknown wealth. It is estimated, for example, that only 10 percent of known plaice grounds are being fished, and it is quite possible that there are also many unknown flat fish grounds. In South African waters a huge pilchard fishing industry has grown up within the past 10 years or so. In the case of crustacea, in the past 50 years new resources have been found and exploited off the east coast of America, the east coast of Australia, the Mexican Gulf, and even in the Mediterranean. Again, only this year an FAO master fisherman discovered a new shrimp ground, 140 miles in extent, ranging along the west coast of India.

"These are only a few instances of finding and exploiting new resources," said Dr. Kesteven. "They tend to support the theory held by some that there are no deserts in the sea and perhaps a survey of aquatic resources may ultimately prove this to be well-founded. However that may be, the steadily increasing catch of fish in the world is a pointer to the potential possibilities. At present, the total catch of fish, crustaceans, and molluscs amounts to about 27 million metric tons, according to the FAO Yearbook of Fishery Statistics. This is about 5 million metric tons more than was caught in, say, 1938, and marine biologists believe that the total might well be raised to some 50 million metric tons annually in the course of the next 20 years or so.

"But in order to increase production, we must have comprehensive knowledge of the resources, and the object of the survey is to provide us with that knowledge.

"I should stress," he continued, "that FAO's part in this survey is a clearing-house of information. We do not carry out research and surveys ourselves, except through the agency of technical assistance projects, but we are attempting to collate all available information and to disseminate that information to governments and international fishery agencies and to other interested fishery organizations, firms, and persons."

In connection with this work, FAO is collaborating with the Bibliographia Oceanographica, with Member Governments of FAO, and with international fishery organizations.

"We attempt to read, appraise, and extract all information in current literature relative to the survey of aquatic resources," explained Dr. Kesteven. "In doing so we read some 2,500 books and contributions in periodicals a year from which we extract information which we record by a punched card system. In a year we probably deal with some 3 or 4 thousand cards. The editors of <u>Bibliographia Oceanographica</u> are engaged on a similar work and produce a great number of reference cards, which they exchange with us.

"We are also engaged on compiling an <u>Oceanic Thesaurus</u> which we hope to make into a compendium of information concerning the species of fish caught in various countries and regions, the economic value of stocks and species, and the productivity of marine and inland waters in all parts of the world."

One of the byproducts of FAO's work will be a world atlas of fishing maps. These maps will contain in simple and easy-to-see form all the immediately important information relative to world fisheries. The atlas will be issued next year. Meanwhile, the information which Dr. Kesteven and his assistants are continually extracting is being brought to the attention of governments and fishery organizations.

"It is important to realise," said Dr. Kesteven in conclusion, "that the work we are doing on this survey of marine resources is only one contribution to the development of world fisheries. There are a great number of other activities involved, such as technical developments in fishing, exploitation of known stocks, and increasing the productivity of the fisheries in underdeveloped countries through mechanization and the introduction of modern catching techniques. There are also a multitude of financial, marketing, social and economic considerations, all of which can, and often do, affect any national or international development of fisheries. Our principal task is basic, that of gaining knowledge and understanding of the marine resources, and when we have that knowledge it will have a practical effect on all policy, plans, and work concerned with the development of world fisheries."

WHALING

WHALE AND SPERM OIL OUTPUT UP IN 1956: World production of whale and sperm whale oils in 1956 is forecast at 425,000 and 105,000 short tons, respectively,

Table 1 - Whale and Sperm Oil Estimated World Production, by Major Producing Country, Annual 1954-56						
		Vhale Oi		Sperm Oil		
Country	$\frac{1}{1956}$	$\frac{2}{1955}$	1954	$\frac{1}{2}$ 1956	$\frac{2}{1955}$	1954
		(1,00	00 Sho	rt Tons)		
Norway	136	138	188	25	26	7
United Kingdom	76	77	90	12	11	9
Japan	83	73	58	27	23	15
Netherlands	16	11	17	3	1	1
Panama	27	27	-	. 3	3/	10
Union of South						
Africa	20	21	31	9	6	4
Soviet Union	29	33	32	15	15	15
Australia	19	18	19	-	-	-
Argentina	8	9	10	$\frac{3}{4}$	$\frac{3}{4}$	$\frac{3}{3}$
Chile4/	3	3	2	$\overline{4}$	4	3
Portugal	-	-	-	4	4	4
Others	8	8	7	3	3	7
World Total	orld Total 425 418 454 105 93 75					
1/ Forecast.	Forecast. 3/ Less than 500 short tons.					
2/ Preliminary.	2/ Preliminary. 4/ Production of Azores & Madeira Islands.					

as compared with 418,000 and 93,000 tons last year (table 1). This increase was due to high vields and came in spite of the cut in the Antarctic catch quota from 15,500 blue whale units to 15,000 per season. Although there was a slight increase in the Antarctic production, most of the increased output came in other areas.

Antarctic whaling, including that done by 3 South Georgia coastal stations, is expected

to account for nearly 90 percent of the world output of baleen whale oil this year. The same area, however, is expected to turn out only about three-fifths of the world supply of sperm oil. The major part of the increase in 1956 sperm oil production is expected to come from Japanese operations, both in the North Pacific and off the coast of Japan.

Although the number of expeditions engaged in Antarctic pelagic whaling in the 1955/56 season was the same as in the previous year (table 2), each expedition

added one or two catcher boats thereby increasing its production potential. Thus the season lasted only 58 days, a considerably shorter period than the 72 and 76 days of the two previous seasons. The total catch amounted to 14,875 blue-whale units, which is 125 less than the 15,000 units maxiumum stipulated by international agreement.

The International Association of Whaling Companies, following a meeting in June, reportedly announced that British, Norwegian, Japanese, and Dutch whaling

Table 2 - Whale and Spe	Table 2 - Whale and Sperm Oil Antarctic Pelagic Production, 1954/55 and 1955/56					
Country		Oil	Sperm		To	
Country	$\frac{1}{1955/56}$	$\frac{2}{1954}$	$\frac{1}{1955/56}$	$\frac{2}{1954/55}$	$\frac{1}{1955/56}$	$\frac{2}{1955/56}$
			(Short 7	Γons)		
Norway	122,227	125,258	24,316	25,833	146,543	151,091
United Kingdom	64,294	64,403	12,140	10,420	76,434	74,823
Union of South Africa	15,042	15,460	5,349	3,169	20,391	18,629
Netherlands	15,901	10,888	3,411	1,195	19,312	12,083
Japan	63,254	58,799	13,058	9,686	76,312	68,485
Panama	27,329	27,193	2,714	409	30,043	27,602
Soviet Union	26,723	30,249	1,972	1,871	28,695	32,120
Total	334,770	332,250	62,960	52,583	397,740	384,833
1/ Provisional. 3/ Does not inc	1/ Provisional. 3/ Does not include production of 3 South Georgia shore stations. In 1955/56 this production, according					

companies had agreed to limit the number of whale-catching vessels for the 1956/57 season to a total of 210, excluding those to be used by the Soviet Union. The agreement stipulates the maximum number of catchers to be used by the companies or groups of companies, but allows the groups to apportion the number of whale catchers among their different expeditions. The total number of catchers used by all expeditions during the 1955/56 season was 257.

and 770 tons, respectively, in 1954/55.

The pelagic catch quota for the 1956/57 season has not yet been announced.

UNITED KINGDOM-SOVIET RUSSIA FISHERIES AGREEMENT

The British and Soviet Governments on May 25, 1956, reached an agreement on Barents Sea fishing limits. The main feature of the agreement, which runs for five years from the time of ratification, is that the 12-mile limit is dispensed with, and the Soviet Union has accepted, in practice if not in principal for the future, the expediency of a 3-mile limit. A separate exchange of letters accompanying the agreement states that nothing in it prejudices the claims or views of either government about the legal extent of territorial waters. According to press reports and a United States Embassy dispatch dated May 28, the five-year treaty falls short of perfection, but it does make important concessions to the British distant-water trawlermen. The following is a summary of the agreement published in the London Times of May 26:

"The agreement means in practice that British vessels will be excluded from the western end of the coast of Russia for a distance of about 100 miles, and that they will no longer be able to fish at the western side of the entrance to the White Sea. Both these stretches were included under the previous agreement of 1930, which expired in July 1955.

"The fishing grounds open to British vessels have been extended along the northern shore of Russia for roughly another 100 miles eastward from their previous limit. British vessels will also be able to fish up to a three-mile limit round the island of Kolguev, north-east of the Kanin Peninsula. The limits are defined as running along the coast of the Kola Peninsula between the meridians 36 degrees and 37 degrees, 50 minutes E., along the mainland to the east of the point at Cape

Kanin between 43 degrees 17 minutes and 51 degrees E., and also along the coast of Kolguev to a distance of three sea miles from low water mark. Under the old agreement the area covered was between 32 degrees E. and 48 degrees E. and included part of the entrance to the White Sea to latitude 68 degrees 10 minutes N.



Australia

TUNA GROUND FOUND OFF SOUTH AUSTRALIA: A major tuna fishing ground exists in South Australian waters off Port Lincoln. It extends at least from Flinders Island to the Neptune Islands and is capable of supporting a tuna industry of reasonable size.

This has been reported to South Australia's Premier by one of two California tuna fishermen brought out by the South Australian Government for trial tuna fishing.

The California fisherman said the tuna were chunkier than those caught off California, giving a better yield with less waste. He said the Government should persevere with investigations into pilchard possibilities also.

Under a Government guarantee the two San Diego, Calif., fishermen came to South Australia for three months' testing of the waters for tuna and to introduce pole fishing to the Australian fishermen. They arrived in early February and operated aboard the M/V Tacoma at first. On March 19 one of the fishermen transferred to the Fairtuna which had only recently been purchased by H. S. Wilson of Port Lincoln.

To date, though southern bluefin made up the bulk of the catch of 160 metric tons, yellowtail, trevally, and several striped tuna were also captured. This is the first recording of the capture of striped tuna in South Australia.

The two California fishermen were scheduled to leave Port Lincoln April 18 on their way home, reports the (Australian) Fisheries Newsletter of May 1956.

Note: Also see Commercial Fisheries Review, July 1956, p. 71.

* * * * *

SALT ABSORPTION BY WHOLE SPINY LOBSTERS IN COOKING: It has been the practive in Tasmania to prepare spiny lobsters (Jasus lalandi) for the home market by drowning them in fresh water and cooking them whole in boiling salt water. It was believed that salt was taken up by the edible meat, thereby improving its palatability.

A survey of Tasmanian processing establishments by an officer of the C.S.I.R.O. Division of Food Preservation and Transport led to the following observations:

Salt concentrations in cooking waters in various factories ranged from 3.5 percent (sea water) to 23 percent by weight.

Many processors assessed the degree of saltiness of the cooked edible meat merely by tasting the leg meat.

No accurate data were available on the extent of salt absorption by the edible meat in different parts of the spiny lobster.

There was no evidence of excessive saltiness in the taste of tail meat from spiny lobster which had been cooked in water having a high salt content.



fore packing.

in the most concentrated solution.

Australian spiny lobsters being weighed be-

Recently some processors, in an attempt to introduce salt into the meat, have drowned the spiny lobster in warm concentrated brine and cooked them in steam. Here again there was no information on the effectiveness of the procedure.

Experiments carried out at the C.S.I.R.O. Tasmanian Regional Laboratory at Hobart to obtain quantitative data on the absorption of salt by the meat of spiny lobster cooked in salt brines indicate different conclusions.

The concentrations of salt found in the four selected portions of meat, raw and after various cooking treatments, are shown in the table, each figure being the average value for three shellfish in each group. Deviations of individual values from the mean were very small. The tail meat absorbed very little salt even in the concentrated solutions; meat more than \(\frac{1}{3}\) -inch below the surface did not absorb salt until the brine strength was increased beyond 10 percent. There was a slight loss of natural salt by leaching on cooking in fresh water, but only from the surface layer. Leg meat absorbed small amounts of salt in brines of low strength and about 1.5 percent

Although marine spiny lobster contain appreciable concentrations of sodium chloride in the edible meat, it is generally considered in the trade that the palatability of the cooked meat is improved by the addition of salt to bring its concentration up to about 1.5 percent. To reach such a level in the tail meat of shellfish similar to those used in these experiments would require an additional 0.8 percent.

The assumption by the trade that cooking whole spiny lobster in boiling salt brines brings about such an increase is not supported by the experimental evidence. Even when they were cooked in very strong salt brines, the increase was only about 0.3 percent. In weaker brines similar to those used by most of the Tasmanian processors there was very little change in salt content of the tail meat during cooking. Cooking in fresh water reduced the salt content only slightly.

It is also clear that the saltiness of leg meat cannot be used as a satisfactory index for assessing the concentration of salt in tail meat. The leg meat in the raw material used had an initial salt content almost twice that of the tail meat and in addition it showed an appreciable increase in salt concentration even in weak brines.

It has been assumed that the practice of drowning the spiny lobster in strong salt brines prior to cooking in steam appreciably increases the salt content of the tail meat. The above results suggest that this would be most unlikely during the short periods of immersion used for drowning.

When the whole spiny lobster is immersed in strong salt brine before or during cooking, small quantities of brine may be entrapped within the shell. It has been argued that there may be an additional uptake of salt from these areas during frozen storage. The diffusion of salt into the edible meat during frozen storage is not

Concentration of Salt	Concentration of Salt in Spiny Lobster Meat						
	Cooked in						
		Fresh					
		Water					
		(Per					
Tail meat (inner)	0.5	0.5					
Tail meat (2nd layer)	0.7	0.7	0.7	0.7	1.0		
Tail meat (surface)	1.0	0.9	1.0	1.2	1.3		
Leg meat	1.3	1.2	1.5	1.8	2.8		

likely to be of great importance according to an article in the May 1956 (Australian) Fisheries Newsletter.

In the raw meat of the three shellfish used in the experiment, there was a welldefined gradient in salt concentration from the center to

the surface of the tail and a larger concentration in the leg muscles. The existance of this gradient has since been confirmed in other cases. It is unlikely, therefore, that it was introduced during handling, for example, by contamination with sea water.

* * * * *

WHALE MEAT SHIPMENTS TO UNITED STATES FOR PET FOOD: An Australian whaling company reportedly has now made definite arrangements to sell its whale meat production from two shore-based whaling stations to a United States firm manufacturing pet foods. The whale meat is to be shipped to the United States in a refrigerated cargo vessel owned and operated by the purchaser of the meat, declares a United States Foreign Agricultural Service report from Canberra.

* * * * *

SHORE-BASED WHALING SEASON, 1956: The Australian shore-based whaling season for 1956 started at Albany in Western Australia on June 8 and on the eastern coast at Tangalooma, Queensland, on June 11. Quotas for the mainland stations will

be the same as last year, but an additional quota of 150 whales has been provided for a new whaling station nearing completion on Norfolk Island. The base quota for this station has been determined at 120 whales per annum, but approval has been given for a quota of 150 whales in this, the first year.

As a result of this increase

in total Australian quotas



An Australian whale chaser. Note folded mast to get under low bridges and on foredeck the tractor which serves as a winch for playing whales.

(1,990 whales), it appears like—
ly that oil production from whaling during the 1956 season will approximately 8 percent higher than last year, and will again exceed 4.8 million gallons (U.S.). The quotas for Western Australian stations, which were reduced last year, have not been revised although 1955 results showed an improvement on the 1954 catch in relation to size.

The Norfolk Island station nearing completion was expected to begin operations some time during August 1956, when the catcher now operating at Byron Bay will be transferred there. The new station is a subsidiary of the same meat company operating Byron Bay station. Government officials believe in spite of some whale-meat exports for pet food to the United States that production of whale-meat meal may be maintained at the level of previous years by greater concentration of solubles. Apparently the prospective dollar earnings provided an added incentive for the approval of whale-meat exports, declares a United States Foreign Agricultural Service report from Canberra dated June 26.



Bahama Islands

FISHERIES TRENDS, 1955: Exports of Fishery Products, 1952-55: The export of spiny lobsters (crawfish) by the Bahama Islands continued to be encouraging in 1955. The export of fresh fish was less than one-third of 1954 exports and far less than the amount exported in 1952.

Prices in the local market are extremely high, however, and fishermen have no difficulty in selling their catches locally.

Value of Bahar	Value of Bahama Islands Exports of Fishery Products and Byproducts, 1952-55							52-55
Product	195	55	19	954	19	953	19	952
Froduct	Ł	US\$	E	US\$	Ł	US\$	E	US\$
Spiny lobsters	160,647	449,812	163,743	458,480	156,920	439,376	99,649	279,017
Fresh fish	1,399	3,917	4,387	12,284	3,992	11,178	10,656	29,837
Shells	21,792	61,018	20,524	57,467	33,014	92,439	23,052	64,546
Sponges	-	-	1,021	2,859	1,198	3,354	664	1,859
Total	183,838	514,747	189,675	531,090	195,124	546,347	134,021	375,259

A possibility exists for the establishment of a tuna cannery in Bimini. During the tuna season, which is short, however, thousands of pounds of tuna are caught by game fishermen and very little of the catch is consumed.

Sponge Fishery: In 1938 the sponge beds of the Colony were devastated by a marine disease and, with the exception of a few months in 1946, were closed until January 1956. The beds remained open until March 31, and the quantity gathered exceeded expectations, and the quality was excellent. The total value of sponge sold at the sponge market, open from April 16 to May 11, was £27,237 (US\$76,264). The harvest consisted of wool, grass, hardhead, and reef sponges. Velvet sponge, 20 years ago marketed in large quantities, appears to have become extinct, according to the United States Consulate at Nassau (dispatch of July 5, 1956). Note: Values converted on the basis of £1 equal \$2,80



Belgium

<u>MARINE OIL MARKET</u>: Belgium's fish oil trade is insignificant. A fair quantity of whale oil is used. There is one small plant which produces about 400 tons of fish oil a year. This oil is not of a particularly good quality since it is made from offal. The offal is a byproduct from the curing of herring. About $1\frac{1}{2}$

Belgium's Crude and Refined Marine Oil Imports, 1955						
Type and Country or Origin	Quantity	Type and Country or Origin	Quantity			
	(Metric Tons)		(Metric Tons)			
Crude:		Other:				
France	23	France	4			
Norway	8,157	Iceland	5			
Netherlands	1,625	Norway	409			
Portugal	. 28	Netherlands	7			
United Kingdom	15	United Kingdom	66			
West Germany	2	Sweden	- 3			
Japan	63	West Germany	4			
United States	598	Japan	· 79			
Falkland Island	508	United States	1			
Sea	740	Total Other	578			
Errors and omissions	2					
Total Crude	11.761					

years ago two of the margarine manufacturers in Belguim imported some American menhaden oil which was refined and hydrogenated. They both claim that the oil reverted and the flavor of the margarine after a few days was unsatisfactory. The margarine manufacturers, themselves, thought that the independent refiners in Belgium had not had sufficient experience in refining fish oil, and the product prepared by them was inferior to that made either in Holland or Germany

There does not seem to be any separate statistics on fish oil alone. These are incorporated in the general category of marine oils. Imports of marine oils, both crude and refined, by source during the year 1955 are shown in the table.

The survey was able to ascertain that out of a total of 71,700 tons of all fats used in the manufacture of margarine in 1955, approximately 10,000 tons was whale oil. No fish oil so far as we could ascertain was used.

Small quantities of lower-grade domestic fish oil are used for industrial purposes, such as leather dressing, etc., and the balance is usually exported to the Netherlands under the BENELUX agreement.

This is one of eight reports on a survey undertaken by the U. S. Fish and Wildlife Service of markets for United States-produced oils with emphasis on Western Europe.

Note: See Commercial Fisheries Review, August 1956, p. 47; also see pp. 66, 70, 71, 87, 90, 96, & 99 of this issue.



British Honduras

STATUS OF THE FISHERIES, 1955: No improvement took place in 1955 in the British Honduras fishing industry. In fact, the value of marine products exports decreased by some 35 percent below that of 1954. The decrease was attributed almost entirely to a decline in the sales of whole spiny lobsters to the United States.

No statistical or other information is available as to total production of the fishing industry. A large number of fishermen provide fresh fish to Belize and the other

Table 1 - British Honduras Exports of Fishery Products								
Product	19	55	1954		1953		1952	
	BH\$	US\$	BH\$	US\$	BH\$	US\$	BH\$	US\$
Fish:								
Fresh, frozen								
or live	4,782	3,347	17,434	12,204	16,204	11,343	9,069	6,348
Salted	7,318	5,123	17,385	12,170	5,206	3,644	9,336	6,535
Lobsters, spiny:								
Whole	16,610	11,627	31,231	21,862	3,019	3,113	10,539	
Tails	74,166	51,916	75,057	52,540	75,288	52,702	79,943	55,960
Other (conchs &								
shrimp)	3,862				2,737			310
Totals	106,738	74,716	143,528	100,471	102,454	71,718	109,330	76,530

coastal towns, generally selling their daily catches direct to the ultimate purchasers or, more infrequently, to retailers who in turn sell at the local fish markets.

The legal entanglements involving the United States firm holding the exclusive franchise for lobster shipments to the United States continued to be before the local courts and were not settled until the spring of 1956. These legal questions continued to be the main reason why lobster fishing was not carried on aggressively. With the settlement of this legal difficulty, it is foreseen that lobster fishing will soon be tackled more forcefully and may result in increased production and exports.

Late in 1955 another firm began exploring the possibilities for shipping lobsters to the Mexican, Guatemalan and other Central American markets. The survey

Table 2 - British Honduras Fishery Products Exports to United States								
Product	1	955	19	954	19	53	1	952
	BH\$	US\$	BH\$	US\$	BH\$	US\$	BH\$	US\$
Spiny lobster, whole								
tails	73,530	51,471	73,926	51,748	74,666	52,266	79,112	55,378
Fish, fresh or froz-			14 000	10.005	10 700	0.050	- 00-	0.000
en		E 7 000				9,653		
Total	181,943	57,360	113,356	79,349	88,540	61,978	90,232	63,162

revealed attractive possibilities, and work was begun in organizing the business and installing freezing and associated equipment, states a United States consular dispatch (June 29) from Belize.

Note: Values converted to US\$ on the basis of BH\$1 equals US\$0,70.



Canada

ANTIBIOTICS FOR PRESERVING FRESH FISH: Canadian experiments in the use of antibiotics in the preservation of fresh fish were described by Dr. H.L.A. Tarr, of the Fisheries Research Board of Canada Technological Station, Vancouver, B. C., in a paper presented at the International Meeting of Fish Processing Technologists at Rotterdam, Netherlands, June 25-29.

In his paper Dr. Tarr stated that aureomycin was more effective than terramycin or tetracycline in retarding the bacterial spoilage of fish. In the course of experiments with salmon caught off Vancouver Island, flaked ice containing 1 p. p. m. aureomycin was found to be superior to ordinary ice. Convenient methods have been found to add aureomycin to flaked ice as it is being made, and to distribute the antibiotic uniformly in block ice. Studies on the penetration of aureomycin into fish meat have revealed that only a small amount gets through the skin or belly flaps, and residual antibiotic is removed when the fish is cooked, reports the June 1956 Trade News of the Canadian Department of Fisheries.

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FISH CONSUMPTION INCREASING: The Canadian consumption of fish is slow-ly rising, partly due to the efforts of the industry and the Department of Fisheries, and also to improved transportation and cold-storage facilities, Canada's Minister of Fisheries told the House of Commons in Ottawa in his annual review. There was a substantial increase in the number of cold-storage units in 1955. The Minister stated that the industry was in good condition, according to a news item which appeared in The Fishing News (June 15, 1956), a British fishery periodical.

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FISHERIES TRENDS, FIRST QUARTER 1956: Despite bad weather Canadian fishermen in the first quarter of 1956 landed the biggest catch on record for that period. Total landings were 459 million pounds valued at C\$10.9 million, compared to 236 million pounds valued at C\$7.0 million for the same period in 1955, points out a June 29 United States Embassy dispatch from Ottawa.

The herring catch on the Pacific Coast was principally responsible for the good showing, with 315 million pounds landed in the three-month period as compared to

117 million pounds a year earlier. On the Atlantic Coast there were heavier than usual catches of haddock and sardines. In terms of ex-vessel value, haddock land-



Filleting operation at a large fish plant in St. John's, Newfoundland,

ings were worth C\$1.9 million and sardines C\$0.3 million, an increase over last year of C\$0.5 million and C\$0.2 million, respectively. The lobster catch on the east coast was valued at C\$1.5 million as compared to last year's C\$1.2 million, although the catch was appreciably smaller this year.

The high level of the first quarter showed signs of dropping off during succeeding months. April landings were 61 million pounds or 27 percent below April

1955 and were valued (C\$3.7 million) at 6 percent less. An exception to the general picture was the very good Pacific Coast salmon catch in April of 535,000 pounds valued at C\$164,000 as compared to April 1955's 288,000 pounds valued at C\$85,000.

Frozen fish stocks at the end of March 1956 were 30.7 million pounds and at the end of April had risen to 34 million pounds. Total freezings of fish in Canada were 50.2 million pounds for the first quarter of 1956 and an additional 12.0 million pounds in April.

Exports of fishery products remained steady at C\$19.5 million for January-February 1956 as compared to C\$19.0 million in the same period of 1955. The United States increased its purchases and continued to be the major buyer. Sales to Europe declined in the first two months from those of a year previous while those to the Caribbean area increased.

* * * * *

MINIMUM MESH-SIZE REGULATIONS FOR ATLANTIC TRAWL NETS: Regulations prescribing minimum mesh sizes in Canadian Atlantic trawl nets will go into effect on January 1, 1957. The regulations apply to nets being used to fish cod and haddock. They do not apply to nets being used to fish ocean perch exclusively.

Table 1 - I	Minimum Mesh Si:	zes for Otter-Trawl Net	ting Used in Subarea 4
Kind of Twine	Minimum Mesh, Internal Measure Used and Wet		Recommended New <u>1</u> / Netting Mesh Size (Between Knot Centers)
Manila -double		60 yds. & largertwine 61-80 yds. 81 yds. & smallertwine	$5\frac{4}{5}$ in. $5\frac{1}{2}$ in. $5\frac{3}{8}$ in.
Manila-single		60 yds. & larger twine 61 yds. & smaller twine	$5\frac{1}{8}$ in. 5 in.
Cotton-single & double	$4\frac{1}{4}$ in.	All sizes	$4\frac{1}{4}$ in.
Nylon-single & double	4 in.	All sizes	$4\frac{1}{4}$ in.

^{1/} These sizes refer to individual pieces of netting. In a bale of netting the pieces usually vary slightly in mesh size. To make sure that all pieces in the bale are at least equal to the recommended mesh size, the netting is usually ordered with a mesh size for leg for g of an inch larger than the equivalent mesh size for new dry netting.

The regulation prescribes a minimum mesh size for all parts of the trawl. The parts mainly affected are the cod end, lengthening piece, and the aft part of the belly. Other parts of the trawl usually have larger meshes than those prescribed as a minimum, the June 1956 Trade News of the Canadian Department of Fisheries announces.

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Mesh regulation is already in effect for Subarea 5, Georges Bank and adjacent waters. The regions affected by the new regulation are Subarea 4 and Subarea 3. Subarea 4 includes the Bay of Fundy, Nova Scotian waters and the Gulf of St. Lawrence. Subarea 3 includes the Newfoundland fishing banks.

Table 2 - Minimum Mesh Sizes for Otter-Trawl Netting Used in Subarea 3						
Kind of Twine	Minimum Mesh, Internal Measure Used and Wet	Size of Twine	Recommended New 1/ Netting Mesh Size (Between Knot Centers)			
Manila - double	4 in.	60 yds. & larger twine 61-80 yards 81 yds. & smaller twine	$5\frac{1}{8}$ in. 5 in. $4\frac{7}{8}$ in.			
Cotton - single and double	$3\frac{3}{4}$ in.	All sizes	$3\frac{3}{4}$ in.			
Nylon - single and double 1/See footnote in table	$3\frac{5}{8}$ in.	All sizes	$3\frac{3}{4}$ in.			

The minimum mesh size prescribed for Subarea 4 is the same as that for Subarea 5. For Subarea 4, Manila netting used in otter trawls must have a mesh size larger than $4\frac{1}{2}$ inches, internal measure, measured wet after use. For Subarea 3, the minimum mesh size for Manila netting is 4 inches, measured in a like manner. Other materials shrink and stretch to a different degree than Manila. They may also allow the escape of different sizes of fish than Manila through the same size mesh opening. The necessary equivalents for other materials are thus included in the preceding tables. Also included are the recommended mesh sizes of new netting which should meet the minimum mesh size specified. Internal mesh size is measured with a gauge which is forced into the mesh under 10 to 15 pounds pressure.

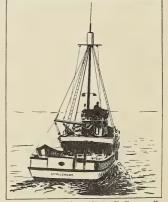
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DISTRIBUTION OF SALMON IN NORTH PACIFIC OFFSHORE WATERS STUD-ED: A survey now being undertaken by Canadian, United States, and Japanese vessels will, it is hoped, prove to be a major step towards determining the distribution and migration routes of salmon and other fish in the North Pacific Ocean.

The crews and the scientific observers accompanying them are making scheduled fishing tests at stations scattered over an immense area, under the auspices of the International North Pacific Fisheries Commission. It is the largest ocean sampling of fish stocks ever undertaken. The scientists hope eventually to find out if overlapping of races between Asiatic and North American stocks occurs, and if so at what point the two populations merge.

The Fisheries Research Board of Canada has chartered two Canadian fishing vessels which, under direction from the Board's Biological Station at Departure Bay near Nanaimo, B.C., are making a series of cruises over nearly 500,000 square miles of ocean. The western boundary of the area to be covered by these two boats is approximately 1,000 miles offshore from British Columbia.

The converted seiner <u>Key West 2</u> completed her first Pacific Ocean run at the end of May and



Canadian converted tuna clipper Challenger off on its first survey cruise in the North Pacific.

started her second after refrigeration facilities had been installed. Key West 2 is also equipped with an electronic device which will enable her captain to "see" schools of fish under water at any point within 180 degrees forward of the boat for short distances.

The second Canadian vessel, the <u>Challenger</u>, a former tuna clipper, left Nanaimo on May 30 on a run which will take her to the farthest limits of the area alloted to Canada for survey.

The ocean stations at which tests are to be made are set out on a grilled map of the North Pacific. United States and Japanese vessels will take their fishing samples north and west of the Canadian area.

The ships are manned by professional fishing crews, and there are scientific observers on each one, points out the June 1956 <u>Trade</u> <u>News</u> of the Canadian Department of Fisheries.

The Canadian vessels will fish with specially made gill nets of varying mesh sizes. Already a number of salmon have been taken in fishing at certain ocean stations. The first catches were mainly of sockeye salmon, with a few pink and some other varieties. Other fish species are not to be overlooked; the vessels are equipped with tuna-trolling gear for use if schools of that fish are encountered.

In the early stages of the survey all specimens are being retained and sent to the Biological Station at Nanaimo for examination. During the later stages a proportion of the fish caught will be tagged and released.

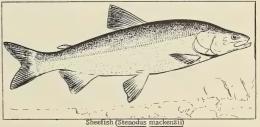
Last year, the Fisheries Research Board had boats follow juvenile salmon from the mouths of streams into Hecate Strait and beyond, through Dixon Entrance in northern British Columbia coastal waters. This year's program calls for the tracing of the movements of fish in ocean waters far from the coast. Tags placed on young salmon last year will be sought at all stages of the investigation. The tags are made of colored plastic tubing and are known as the "spaghetti type." Fishermen have been asked to forward any that are found to any fisheries officer or to the Board's station at Nanaimo.

* * * * *

SHEEFISH OR INCONNU: Early voyagers gave the name "inconnu" to a fish found in the Northwest and Yukon Territories, where it is of importance as food for humans and for sled dogs. When the voyagers first traveled those regions they caught

some of the fish, the first of the kind they had ever seen. "Poissons inconnus"--unknown fish, they said, and since then the word "Inconnu" has passed into usage as the name of the fish, although often it is shortened to "connie" or "coney." In Alaska it is called "sheefish."

The commonly accepted scientific name is Stenodus mackenzii. The "mackenzii" is derived from the fact that



in North America the inconnu is found mainly in the Mackenzie River Basin, although as stated it is also to be found in the Yukon Territory and Alaska. A similar species occurs in Siberia.

Although the inconnus of the Mackenzie Basin all belong to the same species, they appear to be divided into two forms. One of the two is a landlocked or freshwater form found in Great Slave Lake; the other is a migratory form found in the Lower Mackenzie River.

Incomus found in the Yukon are said to be smaller, on the average, than those taken in the Mackenzie district. The fish is light in exterior coloring, with the dorsal fin dusky at the tip and the caudal fin shading to dark at its edge. The lower jaw is longer than the upper and is usually somewhat hooked. There are bristle-like teeth in the upper jaw and weaker ones below. The meat is white but rather soft and oily.

Eskimos of the Mackenzie delta sometimes catch inconnus with barbless hooks, fishing through the ice; sometimes by means of a fishing spoon or bait, or perhaps a hook baited with a thin piece of bone. Commercial fishermen use gill nets to catch the fish, points out the Canadian Department of Fisheries Trade News of June 1956.

There was no fishing for inconnu on a commercial scale until 1945, but since that time fishermen operating on Great Slave Lake have taken them in nets set primarily for whitefish and lake trout. Drying and smoking are the methods used when preparing the fish for future local use.



Cuba

CANNED SARDINE MARKET: Cuban sardine imports in 1955 totaled 185,259 cases (7.4 million pounds) valued at US\$1,369,842, f.o.b. port of origin, reports a July 17 dispatch from the United States Embassy in Habana. Data on sardine imports are not available on a year-by-year basis, but they were compiled for 1955.

Table 1 - Cuba's Canned Sardine Imports by Country of Origin, 1955					
Country		ntity	Value		
	Actual	1,000	US\$		
	Cases	Lbs.	1,000		
United States	75,765	3,068	513		
French Morocco	42,080	1,852	337		
Portugal	23,193	864	221		
Spanish Morocco	16,995	698	136		
Canada	19,071	571	95		
Spain	2,749	115	34		
Holland	2,350	124	17		
Belgium	750	21	6		
Japan	1,600	36	5		
Germany	600	21	5		
United Kingdom	106	2	1		
Total	185,259	7,372	1,370		

The consensus in trade circles is that 1955 was a normal year and indicative of the current market.

Cuba imports substantial quantities of United States sardines. Trade circles stress the possibility of increasing these imports if prices are particularly advantageous. Such increases would not be at the expense of other suppliers, since there is an established demand for the types of sardines imported from other countries. The potential larger market would be dependent upon reduced prices which would en-

courage sardine consumption in substitution for low-cost meat and other fish products.

Trade circles also report that there is a substantial unfilled demand for a can of sardines that can retail for about 10 cents. Such a can must be convenient to open with a key. The packing medium may be tomato sauce or oil, although the best promise would be for an oil-flavored product to resemble olive oil. The number of sardines in a can is not considered important.

There is no production of canned sardines in Cuba.

Consumption follows the pattern which has been established through the years. An increase has occurred when prices of sardines have been especially favorable

Table 2 - Cuba's Ca	Table 2 - Cuba's Canned Sardine Imports by Type of Pack and Country of Origin					
Type of Pack	Quai	Value				
Tomato sauce	U. S. A	Actual Cases 75,761	1,000 Lbs. 3,068 36	US\$1,000 513		
/	Japan Total	1,600 77,361	3,104	518		
Tomato with olive oil	Portugal	7,740 6,798	279 279	67 54		
j	Spain	413 14,951	16 574	125		
Tomato with soya oil	Canada	6,381	185	28		
TD t : t1-	French Morocco	15,149	667	121		
Tomato with	Holland	2,350	124	17		
peanut oil	Germany	200	11	2		
J	Total	17,699	802	140		
	French Morocco	4,208	185	34		
Olive oil	Portugal	12,838	478	130		
Slive oil	Spanish Morocco	10,197	419	82		
	Spain	2,336	98	30		
)	Total	29,579	1,180	276		
1	French Morocco	22,723	1,000	182		
Peanut oil	Portugal	2,615	106	24		
	Germany	400	10	3		
,	Total	25,738	1,116	209		
Soya oil	U. S. A	2	1/	$\frac{1}{67}$		
}	Canada	12,690	386			
,	Total	12,692	386	67		
Mustard	U. S. A	2	1/	1/		
Unidentified	United Kingdom	106	3	1		
}	Belgium	750	22	6		
	Total	856	25	7		
Grand total	Grand total					
1/ Less than US\$1,000 and 1,00	0 pounds.					

as compared with prices of other low-coast fish and meat products, and during periods of scarcity of these products. Consumption is at its peak during the sugar season and other periods of high employment, when workers buy sardines for their meals at work. It appears there would be little receptivity to new uses of sardines since they are consumed without further processing.

The percentage of sardines consumed by the high, medium and low income groups is estimated at 5, 15, and 80 percent, respectively.

Retail market prices for $3\frac{1}{4}$ -ounce canned sardines packed in tomato sauce (United States or Canadian) range from 10-15 cents a can; $3\frac{1}{4}$ -ounce sardines in olive or other oil from 12-20 cents, with a popular price of 2 for 25 cents for lower-priced brands; 15-ounce cans in tomato sauce range from 28-40 cents with 30 cents generally applicable to California sardines and 38 cents to other imports. Other types of sardines range in price from 30-45 cents, depending on the marketability of the particular product.



Denmark

FISHERY PRODUCTS EXPORTS TO UNITED STATES: Danish fishery products exports to the United States have climbed from 12.6 million kroner (US\$1.8 million) in 1953 to 13.8 million kroner (US\$2.0 million) in 1954 to a high of 16.8 million kroner (US\$2.4 million) in 1955. Fish exports to the United States consisted mainly of frozen brook trout and smaller amounts of canned mackerel, fresh cod fillets, and fresh plaice fillets in that order, according to a United States Embassy dispatch (July 3) from Copenhagen.

Feedstuffs exports to the United States, consisting largely of fish meal, have dropped sharply from 9.6 million kroner (US\$1.4 million) in 1954 to 3.1 million kroner (US\$0.4 million).

Note: Values converted to US\$ on the basis of 6,907 kroner equals US\$1.

* * * * *

MARINE OIL MARKET: Denmark's trade in fats and oils is quite large in proportion to its population of about 4.5 million people. While fish oil is not one of the major oils used in Denmark, its importance is increasing each year (table 1).

There is considerable feeling in Denmark that fish oil will become more important because it is anticipated that the production of whale oil by European whaling units will probably decrease due to the greatly increased operating costs. Practically all of the fish oil produced in Denmark is either herring oil or tobis (sand eel) oil. The tobis is an eel-like

Table 2 - Denmark's Fish Oil Exports by Country of Destination, 1955 Country of Metric Destination Tons West Germany 5,201.0 2,215.1 Norway Sweden 4,800.6 Holland 112.5 Spain 57.0 Czechoslovakia....... 68.4 Others 14.4 Total 12,469.0

	Table 1 - Denmark's Production of Fish Oils, 1949-55					
Year		Metric Tons				
1955		19,000				
1954		11,000				
1953		9,770				
1952		6,701				
1951		5,948				
1950		2,517				
1949		2,391				

fish which is caught in the North Sea and yields an oil very similar to herring oil. The smaller fish reduction plants mix it with the herring oil without indicating that the resulting product is a mixture. The iodine number of the herring oil produced in Denmark runs from 135 to 150, while tobis oil runs from 145 to 160.

The survey included the most modern and up-to-date fish reduction plant in Denmark at Esbjerg. This is a co-

operative operation and was founded in 1948 and is at present handling about 1,500 tons of fish a day. Its members own 160 boats fishing for reduction purposes exclusively. A great deal of the fish oil produced in Denmark is exported (table 2).

Imports of fish oil are practically negligible—163 metric tons in 1955, mostly from Norway (109.2 tons) and some from Sweden (51.7 tons). Imports of whale oil were 16,103 tons of which 15,054 tons came from Norway.

In the course of the survey, the two plants in Denmark that refine and produce edible grades of fish oils for use in Denmark were visited. One is at Aarhus and the other at Copenhagen. In both cases they indicated that they found that United States menhaden oil was not suitable for their purpose. It does not produce the type of edible product that is required. All of the fish oil used in Denmark (with the exception of very minor amounts) is for edible purposes in combination with whale

oil, for the manufacture of margarine. It was indicated that should Denmark ever find it necessary or advantageous to import fish oil that the following order was their judgment of the quality of various fish oils produced in other countries, starting with the best:

(1) Canadian pilchard oil.

(2) Norwegian or Iceland herring oil. (5) Moroccan and Portuguese oils.

(3) California pilchard oil.

- (4) American menhaden oil.
- (6) Angola fish oil.

Neither of these refiners is polymerizing fish oil for the production of edible liquid fish oil. It was indicated that since the German Government took action forbidding the use of polymerized fish oil, for edible purposes, practically no plants are producing polymerized oil at present and the use of edible fish oil for fish canning has declined considerably. Its place has been taken by edible vegetable liquid oils such as cottonseed oil and/or soybean oil. Both of these plants indicated that they were able to produce a good quality of edible hydrogenated fish oil suitable for the manufacture of margarine and which did not revert to the fishy flavor for a considerable period of time. They claim that they have a special refining method by which the oil is neutralized as quickly as possible after production, being stored in that condition rather than as the crude and untreated material. Both of these plants

> have distillation units and make distilled fatty acids from the refining residues, however, they do not fractionally distill the fatty acids. These fatty acids are sold to the industrial trade.

Table 3 - Denmark's Fish-Liver Oil Imports by Country of Origin, 1955 Country of Metric Tons Destination West Germany 279.4 37.2 United Kingdom 1,182.8 Norway..... Iceland 671.6 49.2 Greenland Portugal 10.4 Others 4.5 Total 2,235.1

Practically no fish oil, as such, is used in Denmark for industrial purposes. For purposes such as leather treating, etc. seal oil is imported principally from Norway (1,032 tons out of a total of 1,042 tons) and some sperm oil is also imported for the production of higher alcohols. Considerable quantities of fish-liver oil are also imported and used for fortifying the margarine produced in Denmark (table 3).

It is understood that there is also an export of hydrogenated fish oil and whale oil. It was impossible to secure accurate statistics since the figures are included in the category of "hardened animal oils" (table 4).

Table 4 - Denmark's Exports of Hardened Animal Oils 1/by Country of Destination, 1955					
Country of	Metric	Country of	Metric		
Destination	Tons	Destination	Tons		
West Germany	29.3	Egypt	501.7		
East Germany	115.3	Tunisia	70.3		
Sweden	5.4	French Morocco	259.2		
Iceland	20.0	British Egyptian			
Finland	8.8	Sudan	16.3		
Italy	147.9	Iraq	20.3		
Switzerland	30.0	Iran	10.2		
Greece	169.5	Cyprus	56.8		
Haiti	38.4	Syria	27.0		
British West Indies	287.8	Lebanon	19.9		
Peru	532.0	India	12.1		
Eduador	34.6	Others	140.0		
(Continued in next column		Total	2,559.3		

1/ It should be understood that probably nearly all of this consists of fish and/or whale oil since there is very little actual tallow, grease, or other hydrogenated animal fat exported from Denmark.

Note: See Commercial Fisheries Review, August 1956, p. 47; also see pp. 58, 70, 71, 87, 90, 96, and 99 of this issue,

Ecuador

NEW FISHERIES REGULATIONS: A decree has been promulgated providing that exporters of fish shall deliver to the Central Bank their full foreign exchange earnings or that portion of their earnings which the Monetary Board may fix. The Fisheries Law had previously required that only US\$100 per ton need be converted at the Central Bank's official exchange rate; the balance could be converted through the broker's free market or retained by exporters. Reportedly some 2,000 tons of tuna were exported during 1955 with a total value of approximately US\$600,000, together with approximately 1,000 tons of shrimp valued at around US\$1,600,000. Only US\$300,000 were converted at the Central Bank, according to a July 13 report from the United States Embassy at Quito.

The Ministry of Economy has also issued a regulation requiring that export taxes be collected on all fish shipped abroad. Reportedly fishing companies had been obtaining exemption from export taxes on the ground that they were shipping an industrial product. (Industrial products pay no export duties.) According to the National Fisheries Director, fish that are merely frozen but not canned do not come within the industrial category. The exemption had allegedly been causing a loss of 1,000,000 sucres a year to the National Treasury.

The new decree on foreign exchange amends Article 36 of the basic Fishing and Maritime Hunting Law (Ley de Pesca y Caceria Maritima), Decree No. 003, published in Registro Oficial No. 747 of February 23, 1951, as follows (in informal English translation): "... exporters of fish, crustaceans, etc. will turn over to the Central Bank the net product of their exports by their declared value, duly verified, or according to the minimum prices fixed by the Monetary Board in relation to prevailing quotations in the international markets, in accordance with the power granted the Board by Article 1 of the Fishing Law..."

An article appearing in the Guayaquil newspaper El Universo of July 8, 1956, states that the promulgation of the new decree confirms reports which the paper has been printing recently to the effect that companies exporting products of the sea have been gravely prejudicing the Ecuadoran Treasury by evading various provisions of the Fishing Law, that the Minister of Economy was aware of this situation and was studying the necessary means to put a stop to such practices, and that one of these means is the present Emergency Decree. The paper goes on to say that on May 31, 1956, the Minister of Economy communicated to the President the reasons for promulgating the decree. The Minister stated that in compliance with the then existing Fishing Law, exporters were required to turn over to the Central Bank only US\$100 for each ton of exports. The Minister said that unquestionably this constituted a privilege for such exporters amounting to an official subsidy. He stated further that such exporters enjoyed better facilities than were granted exporters of other basic products who sometimes find themselves in an unfavorable situation. He then quoted figures to show that exporters of fishing products were being required to turn over to the Central Bank only about 12.5 percent of the foreign exchange value of their exports while retaining some 87.5 percent for themselves. The Minister compared this with the situation of banana exporters who are, he stated, permitted to retain only a few centavos on each stem exported, to be exchanged at the free market rate as partial compensation for their present difficulties. The Minister cited the foregoing as justification for the Emergency Decree, stating that the present deficit in the international balance of payments does not permit waiting until Congress convenes. The article concluded that the National Council of Economy has unanimously approved the promulgation of the Emergency Decree for the same reasons.

In an article published in <u>El Universo</u> on July 10, 1956, it was stated that the National Council of Economy has approved the new decree and that the Monetary Board would meet in Guayaquil starting July 10 to discuss the fixing of the minimum

export prices and consequently the amounts which must be turned over to the Central Bank by exporters of fish and seafood.

In \underline{El} <u>Universo</u> of July 11, 1956, it was announced that the Junta Monetaria resolved at its session of July 10 that the same "appraisement control" regarding the exportation of shrimp would be maintained until August 10, 1956, and that the question of the percentage of foreign exchange to be turned over to the Central Bank after that date would continue to be studied at the Board's current meetings in Guayaquil.

In connection with taxes on fishery products exports, the Ministry of Economy issued Resolution No. 155, published in Registro Oficial No. 1164 of July 4, 1956, instructing the Fisheries Department of the Ministry to notify persons and companies who apply for exemption from export taxes on sea products which are not "industrialized," as provided by Article 37 of the Fishing Law, that they are required to pay such taxes. An article in El Universo of July 12, 1956, stated that the resolution was issued to implement the measures taken by the Ministry to curtail the "sinecures and privileges" enjoyed by seafood exporters to the detriment of the Ecuadoran Treasury. It is explained that filleted fish and frozen seafood are not considered by the authorities to be "industrialized products" within the meaning of the Fishing Law, points out a July 12 dispatch from the United States Embassy at Guayaquil.

* * * * *

NEW FISHING COMPANY TO ERECT CANNERY: An executive decree has been issued authorizing the Minister of Economy in Ecuador to sign a fishing concession and industrial protection contract with a new company. The company will agree under the contract to erect a cannery in Guayaquil. The new concession will bring to five the number of fishing companies established in Ecuador, points out a dispatch of July 13 from the United States Embassy at Quito.



Finland

NEW LAW ON TERRITORIAL WATERS: The Finnish Diet on May 23, 1956, gave its final approval to a Government-proposed bill on territorial waters which presumably will be signed by the President and take effect in the near future. The bill is essentially a codification and clarification of existing practice, required by various changes in Finnish territorial boundaries and by the previous lack of any comprehensive law delineating Finland's territorial waters and clearly defining the basis therefor. In the Peace of Dorpat (Tartu) of 1920 with the Soviet Union, the Finnish waters in the Gulf of Finland were fixed at four miles but the limits in the Gulf of Bothnia had not been specified in any basic instrument.

The main principles applied by Finland in determining its territorial waters are (1) the four-mile limit of marginal sea common to the Scandinavian countries and, in the Gulf of Finland, the U.S.S.R., and (2) the "broken line" (rather than circular) method of drawing the base line for the marginal sea. (Using terminology of this bill, the line dividing inner and outer territorial waters, in addition to which the literature speaks of inland waters.) Islands situated outside the base line have territorial waters only three miles wide. However, the base line is extended between headlands or islands which are not separated by a distrance of more than twice the width of the marginal sea. Therefore, considering the provision in the bill that the inner territorial waters should be extended as far out as possible, the reference to islands outside the base line becomes academic in many cases because such islands will be within the base line.

According to the Director of Legal Affairs in the Finnish Foreign Ministry, the territorial waters resulting from the new law will differ little from the present definition and will not conflict with those of either Sweden or the Soviet Union. To avoid such conflict, the bill specifies treaty boundaries rather than the general limits in certain areas. Such exceptions are obviously necessary at the southeastern and northwestern limits of Finland's territorial waters, where the maritime frontiers are determinative out to the four-mile limit. In addition, near the former Finnish (now Soviet) island of Suursaari in the Gulf of Finland the 1947 Peace Treaty specified a Finnish maritime boundary somewhat less than three miles from the most southerly Finnish island. Similarly, the island Märket west of the Aaland Islands is both a point of the Finnish base line and an international boundary marker (half Finnish, half Swedish) under the 1811 Peace of Hamina.

Two other portions of the Finnish-Swedish maritime boundary, Marenkurkku about the middle of the Gulf of Bothnia and near Flotjan south of the Aalands, were drawn as a result of the Peace of Hamina within the Finnish territorial waters as determined by the new law. The Finnish Government regards the old boundaries as meaningless in these cases, according to the Director, because Sweden's territorial waters as presently defined do not meet those of Finland.

It can be assumed that the Finnish Government has been in consultation with the Swedish Government regarding these three points of possible conflict. Thanks apparently to Swedish restraint, channels of open sea have been left between Finnish and Swedish waters all the way to the head of the Gulf of Bothnia. Asked about the comparable situation in the Gulf of Finland, Professor Castren told the Embassy that there was no longer any difference of opinion among authorities on international law over its accessibility through international waters (United States Embassy in Helsinki, report dated June 4, 1956).



France

MARINE OIL MARKET: Fish oil in France is a very minor item in the over-all fats and oil picture. Outside of a small quantity of whale oil (which is used for edible purposes) and some sperm oil (which is used for the production of higher alcohols), nearly all of the fish oil used in France is of a very low quality. As an example, the leather industry uses it for leather stuffing.

Production in metropolitan France of sardine oil totals approximately 5,000 tons a year and does not seem to vary much from year to year. Morocco produces 1,500 to 2,000 tons a year. In the overseas territories, about 1,000 tons of sperm oil are produced. The total needs are estimated to be approximately 12,000 to 13,000 tons a year. Some of the foots from the partial refining of low-grade fish oils is used in the soap industry. This refining is not done, however, for the purpose of making the oil into an edible product.

A small quantity of refined edible oil is imported each year from Norway for fish canning. The amount for which licenses will be issued in 1956 is 600 tons. France does not permit the use of polymerized fish oil for edible purposes. They follow the same attitude as Germany in this respect, considering that the polymerization does something to the fish oil which makes it toxic under some conditions.

There is an import of from 500 to 1,000 tons of fractionated fish oil from South Africa. The grade imported is known as "Marinol K," a high iodine number fraction. The present value of this oil is about £120 (US\$336) a long ton. In order to be attractive to the trade, this must sell at about 10 percent under the local cost of linseed oil. The French government committee does not make very much money

available for this product and sometimes it carries a compensatory tax, depending on the relative price compared with linseed oil. It is used mostly in the manufacture of core oils and paint, and there is apparently only one company which is importing this product.

The present duties on drying oils are now under suspension but, as stated above, there is a compensatory tax which is based on the price of the fish oil, compared with other drying oils such as linseed oil. There is an import of hydrogenated fish oil and whale oil in small quantities from Norway, but the amounts have not yet been obtained. Statistics for fish oil are very sparce in France since, in the past, they have, with the exception of cod-liver oil, all been put into a single category. It is expected that, beginning with 1956, both import and export statistics will be broken down, and there should be better reporting in the future for the different marine oils. Statistics regarding the production of fish oil are quite unreliable.

France has been unwilling to make available dollars for the importation of fish oils from the United States and it would appear that the market here is not very large unless some specialty oils, which would require intensive and specialized selling, were offered. The French government would also have to be persuaded that they are necessary for the promotion of industrial production.

This is one of eight reports on a survey undertaken by the U. S. Fish and Wildlife Service of markets for United States-produced fish oils with emphasis on Western Europe.

Note: See Commercial Fisheries Review, August 1956, p. 47; also see pp. 58, 66, 71, 87, 90, 96, & 99 of this issue,



German Federal Republic

MARINE OIL MARKET: Germany is probably the largest fish and marine-animal oil consuming country in Europe. Again as in other countries in Europe the bulk of the oil is used for edible purposes. Out of Western Germany's total consumption in 1954 of 157,000 metric tons of whale oil and fish oil, approximately

of Marine Fats and Oils, 1954-55				
Туре	1955	1954		
	(Metric	Tons)		
Whale fat and oil	n.a.	21,059		
Cod-liver oil, crude	n.a.	2,050		
Cod-liver oil, processed	n.a.	2,000		
Other marine fats and oils	29,700	28,500		

35,000 tons were used for industrial purposes and 122,000 tons for human consumption. The United States furnished the greater part of Western Germany's imports of fish oils both for 1954 and 1955.

United States menhaden oil in Germany purchases only untreated crude oil, having had considerable difficulty in past years with refining and bleaching other types of oils. The firm is now satisfied with the quality of the oil they are securing. They claim to have developed a process for refining and hydrogenation which gives them a product satisfactory for use in margarine and none of the oil they purchase, except for the foots from refining, is used for industrial purposes. They contend that some suppliers have in the past been in the habit of mixing "tank bottoms" and the resulting product has contained considerable dirt as well as excess stearine from settling.

There is no Solexol plant operating in Germany. There are two companies who produce fatty acids from fish oil and fractionate these, selling the resulting fractions for various purposes, such as the manufacture of alkyd resins, etc. Some hydrogenation of fish oil with splitting of the same is also effected. A good grade of stearic acid is produced by this method and finds a ready market. Both of these companies are located in the upper Rhine area.

Some of the smaller companies purchase their supplies of fish oil through a dealer in Hamburg. It is the practice of this dealer to purchase menhaden oil from

Table 2 - German Federal Republic's Imports of Marine Fats and Oils by Country of Origin, 1954-55					
Type & Country of Origin	1955	1954	Type & Country of Origin	1955	1954
	(Metric	Tons)	(Metric Tons		
Whale Oil:			Other Marine Fats & Oil	<u>s</u> (Contd):
Denmark	0	21	Norway	7,874	9,770
Great Britain	151	10,267	Portugal	1,786	1,426
Iceland	0	859	Sweden	149	475
Netherlands	841	601	South African Union	2,284	5,759
Norway	36,871	60,145	Angola	6,198	0
Portugal	1,150	1,804	Spanish Morocco	32	449
South African Union	0	2,669	Port. West Africa	0	8,886
Japan	15,092	25,348	French Morocco	0	27
Panama	19,835	9,729	Vietnam	150	0
Peru	772	2,571	United States	31,780	34,180
British Guiana	9,150	500	Canada	1,235	2,680
Australia	5,389	5,723	Return goods	0	2
New Zealand	0	152	Unspecified	1	2
Unspecified	5	2	Total $\underline{1}/\ldots$	67,940	109,161
Total <u>1</u> /	83,256	121,391	Hardened Fats & Oils: 2		
Other Marine Fats & Oils:			Denmark	0	8
Belgium	633	5,598	Netherlands	83	12
Denmark	6,421	5,890	Norway	7,399	2,191
France	220	40	Switzerland	2	9
Great Britain	2,180	12,691	India	30	0
Eire	84	188	United States	30	14
Iceland	844	4,153	Return goods	1	0
Netherlands	6,067	21,946	Unspecified	0	13
(Continued in opposite co	lumn)		Total	7,545	2,247
1/ Totals may not add up due to round	ung.		2/ includes also non-marine lats	and ous,	

the United States as well as herring oil from other countries and blend the same to make a standardized mixed fish-oil product. The usual purchases by this dealer are in 300- to 500-ton lots. The firm sells out of storage tanks at Rotterdam thus saving buyers the cost of putting up money for letters of credit, etc.

This dealer prefers to purchase United States fish oil shipped from Gulf coast ports since the iodine number is less than that of the oil shipped from the Atlantic sea ports, particularly the oil shipped from northern ports.

Some feel that the reduction in imports of fish oil from the United States recently was due to the increase in imports of cottonseed oil, since the consumption of margarine containing fish oil declined whereas the consumption of the best grade of fortified margarine made from vegetable oils increased. The price of margarine is fixed in Germany and with the increase in the cost of vegetable oils some think that the manufacturer of the top-grade margarine will be forced to seek an increase in price and if this is granted then its consumption will possibly decline and the consumption of lower grades will increase. One of the independent producers of refined hydrogenated marine oils for the margarine trade informed us that whereas the content of the marine-oil portion of margarine used to consist approximately of 60 percent whale oil and 40 percent fish oil, it now consists of approximately 30 percent whale oil and 70 percent fish oil. Fish oil usually sells here in Germany at about 10 percent ent less than whale oil.

The following is the order preferred by German buyers of fish oil when they buy independently and do not purchase oil of a guaranteed iodine number by a principal buyer:

1. Canadian pilchard oil.

2. Norwegian and/or Danish herring oil.

3. Iceland herring oil

4. U.S. menhaden oil.

5. Angola, Moroccan, Portuguese, etc. fish oils.

The last category, we were informed, was only suitable for industrial use but again, we also heard, that these types of oil are mixed in with a better grade, on occasion, for refining and hydrogenating.

Starting this year Western Germany's official statistics on the production of fish products, including oil and meal, will be very good. At the present time some

Table 3 - German Federal Republic's Exports of Marine Fats and Oils by						
			n, 1954-55			
Type & Destination	& Destination 1955 1954 Type & Destination 1955 1954					
	(Metric	Tons)	Other Marine Fats & Oils (Contd.):	(Metric		
Whale Oil:			Uruguay	0	10	
Belgium	0	608	Unspecified	25	25	
Italy	150	91	Total	13,682	5,450	
Switzerland	258	0	Hardened Fats & Oils: 1/			
Unspecified	18	4	Belguim	0	41	
Total	426	703	Denmark	159	7	
Other Marine Fats & Oils:			Eire	0	50	
Great Britain	0	571	Italy	0	36	
Italy	52	20	Netherlands	153	281	
Netherlands	1,553	2,770	Austria	5,541	5,617	
Norway	8,539	329	Switzerland	107	282	
Austria	33	41	Czechoslovakia	0	475	
Rumania	0	10	Israel	1,537	793	
Sweden	3,421	420	Spain	5	0	
Switzerland	49	105	U.S.S.R	2	0	
Spain	10	0	Uruguay		5	
Czechoslovakia	0	763	Unspecified	18	10	
Colombia	0	386	Total	7,522	7,597	
(Continued in opposite col			Re-export of hardened			
1/ Includes also non-marine fats and	oils.		fats & oils after proc-			
6.43 6:		essing	2,624	974		

of the figures are included in other categories. As an example of this, hardened fish oil is included in the general category of "hardened fats and oils," for both imports and exports. These categories, of course, will include hardened vegetable oils and, as a consequence, it is impossible to obtain any accurate figures regarding exports of hydrogenated fish and whale oil. Some think that a greater part of the exports of hardened fats and oils consists of whale and/or fish oil while others feel that the amount is not so great.

In Germany as is the case with all other countries the production of fish oil is incidental to the production of fish meal which is more valuable. There are occasions during the year when fish only have about 2 percent oil content, increasing later in the year to around 18 percent or over. In most countries fishing goes on and reduction of the same takes place irrespective of the oil content.

It would appear that Germany will continue to import large quantities of fish oil from the United States both directly and through transshipment at Rotterdam.

This is one of eight reports on a survey undertaken by the U. S. Fish and Wildlife Service of markets for United States-produced oils with emphasis on Western Furone

Note: See Commercial Fisheries Review, August 1956, p. 47; also see pp. 58, 66, 70, 87, 90, 96, & 99 of this issue,



Greece

STATUS OF THE FISHERES, 1955: Fishing activity in Greece has been steadily on the increase since World War II. Through the application of a development program, sponsored and financed by the United States Aid Mission, the industry underwent modernization and expansion.

Before the war there were about 3,000 small boats engaged in offshore fishing, few of which were motor-driven. By 1955 the number of such boats had increased to 10,500 of which 2,500 were motor-propelled. The number of motor trawlers and purse-net boats increased from about 500 in 1938 to 683 in 1954 and 745 in 1955. Most of these boats are of postwar construction, and are all equipped with imported or locally-made Diesel or semi-Diesel engines. Many have cold-storage and radio-communication facilities and some even carry modern depth-sounding instruments. Since 1953 two medium-size open-sea fishing boats have been added to the country's fishing fleet.

Fish production has increased sharply since the war and by 1954 and 1955 the annual catch was 60,000 metric tons (25,000 to 35,000 tons prewar).

Greek Production of Fish and Sponges, 1935-38 and 1949-55								
Item	1955	1954	1953	1952	1951	1950	1949	Avg. 1935-38
	(Metric Tons)							
Fish	60,000	62,000	52,000	43,000	45,000	55,000	45,000	30,000
Sponges	135	135	64	128	143	169	161	50

Fish processing has also made marked progress. There are now some 120 packing plants in Greece whose annual output is about 6,000 tons. There are also 2 fish canning plants with a total annual output of 500 tons.

Plans are under way for the construction of modern fish markets in a number of distribution centers, including Piraeus. These will be equipped with modern handling and storage facilities.

Progress is also being made in restocking and developing fresh-water fisheries, particularly in Northern Greece, with encouraging results.

The sponge fishing industry has also made considerable headway since the war, mainly because of the annexation of the Dodecanese Islands where sponge-fishing is an age-long tradition. Before the war there were about 100 vessels engaged in sponge fishing in Greek waters and along the North African coast, bringing in an annual catch of between 40 to 60 tons. In 1954, 144 sponge-fishing craft were in operation. In 1955 the number increased to 159. Production was 130 tons in 1954 and 135 tons in 1955. Competition from synthetic sponges has had an adverse effect on the demand for sea sponges, and exports are becoming increasingly difficult. However, there has been no accumulation of stocks in recent years.

Despite the very substantial progress made in agricultural and fishery production in the postwar period, Greece still depends on imports for a substantial portion of its food requirements. The list includes fresh and salted fish and fish products.

With the termination of the guerrilla war in 1949, plans for economic development began to take concrete form. A joint Greek Government-United States Aid Mission Central Loan Committee was set up in 1949 for the purpose of financing private Greek industrial and other productive enterprises. By 1954 a total of 259 loans on fisheries were made (embracing 202 projects) and the amount of the principal for these loans was \$2.1 million, a United States Embassy dispatch from Athens (June 14) points out.

Exports of sea sponges (one of Greece's principal exports) were valued at US\$1.5 million f.o.b. in 1952/53 and rose to US\$1.7 million in 1953/54 and 1954/55.



Guatemala

COMMERCIAL FISHING POSSIBILITIES: A Guatemalan fish market operator has obtained a permit for engaging in commercial fishing in Guatemalan waters. Two boats of about 70 gross tons each are reported en route to the Caribbean to intiate operations there. Possibility of participation by a United States firm has been mentioned, points out a July 13 report from Guatemala.



Hong Kong

OYSTER PRODUCTION AND CULTURE: Under the supervision of the Hong Kong Fisheries Division 553,000 pounds of fresh oyster meats were harvested from the Deep Bay beds adjoining British territory. This quantity yielded almost 17,000



Oyster piles at Ping Shan,

pounds of dried oysters and 36,000 pounds of oyster juice for export to the United States, plus a balance of 32,000 pounds of semidried oysters for local consumption.

Experimental work continued at Deep Bay, where rafts and stands are being used to demonstrate the Japanese "hanging-drop" method of oyster culture. The Deep Bay oysters, which had earlier been transplanted to a different environment in Tolo Harbour, and are now suspended from rafts moored near Centre Island, continue to survive.

These oysters are under careful observation and it is hoped that it will prove possible to introduce an edible oyster industry to this area.

Both the Deep Bay and Tolo Harbour investigations are being carried out as joint projects by the Fisheries Division and the Fisheries Research Unit of the University of Hong Kong, states a June 28 report from the United States Consulate at Hong Kong.

Iceland

FISHERIES INCLUDED IN PROGRAM OF NEW CABINET: Included in the program of the new Icelandic cabinet are some plans for the fisheries. The Government will take up collaboration with the organizations of trade unions, farmers, and fish producers in order to find the best solution to economic problems. In consultation with these organizations, the Government will immediately appoint a committee of specialists to make a study of the economic situation, with the aim of achieving the best basis for Government policy decisions, reports a July 25 United States consular report from Reykjavik.

A decision has already been reached to seek the purchase of 15 trawlers and loan capital to finance such purchases.

The Government will work for extension of Icelandic territorial waters, and declares that extension of the fisheries limits around the country is a burning necessity for employment security.

* * * * *

NORTH COAST HERRING SEASON: The North Coast herring season thus far has been the best in many years with catches on some days being reminiscent of the good old days of the early Forties. The total North Coast herring catch as of July 21 stood at five times the catch as of the same date last year and twice the total for last year's entire North Coast season (table 1).

As of the time of writing, 240,000 barrels were salted, and salting operations were suspended except for a few small specialty orders. Unless new orders are received the boats will henceforth deliver all catches to the reduction plants for production of meal and oil. While these are worthwhile export commodities they bring in, measure for measure of fresh herring consumed, only about a third the income in foreign exchange received for salted herring. Since salted herring is relatively perishable, Icelanders do not salt beyond actual contracts on hand. At-



Icelandic fishing vessel brailing herring.

tempts are now being made to sign new contracts for an additional 50,000 barrels with the Soviet Union and 10,000 barrels with Czechoslovakia. There are no cantracts with United States buyers. Exports of herring products from the current season will begin after the middle of August.

Table 1 - Iceland's North Coast Herring Catch 1/ as of July 21, 1956						
	1956			1955 (comparable per		
	No.Bbls.	No.Bbls. Wt./Bbl. Total No.Bbls. Wt./H				Total Met. Tons
To Reduction Plants	202,317	135 kg.	27,313	7,591	135 kg.	1,025
For Salting	217,354	135 "	29,343	81,210	135 ''	10,963
For Freezing	7,280	100 "	728	4,328	100 "	433
Total					12,421	
1/Fresh whole herring.						

It is to be noted in table 2 that for 8 out of the 18 years the catch was over $120,000 \; \mathrm{tons}$. This gives an indication of just how dreary the catch failures of the recent six lean years have been.

Table 2 - Iceland's North Coast Herring Catch 1/, 1938-55						
Year	Met. Tons	Year	Met. Tons	Year	Met. Tons	
1955	28,895	1949	62,656	1943	176,640	
1954	26,618	1948	60,266	1942	145,663	
1953	42,607	1947	122,382	1941	93,434	
1952	11,123	1946	129,504	1940	235,052	
1951	59,624	1945	51,816	1939	140,518	
1950	31,989	1944	216,473	1938	184,674	
1/ Fresh whole herring.						

The technicians, who hardly dare to be hopeful, point out that consitions thus far are more those usually association with bad years than good. They refer to the distance of the herring from shore, their "premature" fatness, the food supplies in the sea, etc.

To put the impact of the catch in perspective, however, it may be recalled that herring last year accounted for only about 12 percent of the total catch both in quantity and value, in spite of a larger-than-usual assist from the South Coast herring season. The more important groundfish catch (88 percent of the total in value last year) as of June 30 this year was running 7 percent under last year (239,000 metric tons in comparison with 257,000 tons). The herring catch will accordingly have to be very good if it is to improve the situation to any important degree. So far it has not quite made up for the modest reduction in the groundfish catch, though it promises to do so very soon. Needless to say, if it continues at its present rate, it will greatly surpass last year's levels.

The Herring Production Board reports that advance contracts have been signed for sale of 250,000 barrels of salted North Coast herring (if available) and 80,000 of South Coast herring. The U.S.S.R. will take "up to 150,000 barrels," Poland 10,000 barrels, Finland 70,000-80,000, and Sweden 60,000-90,000 barrels. The Soviet taking would accordingly be about 20,000 metric tons, or almost double its over-all purchases of the last 17 months. Since herring products have gone in approximately equal quantities to Bloc and to free countries, a greatly increased catch would not necessarily affect substantially the Soviet Bloc's relative share of Iceland's export trade.

The Government has fixed the following guaranteed ex-vessel minimum prices on North Coast herring: 120 kronur per barrel of 100 kilos (US\$3.35 per 100 pounds) of fresh whole herring for salting; this compares with 108 kronur (US\$3.02) last year. The price for fresh herring delivered to reduction plants: 80 kronur per barrel (US\$2.24 per 100 pounds) in comparison with 70 (US\$1.96) last year, according to July 25 and July 17 reports from the United States Embassy at Reykjavik.

Approximately 200 motor boats and one trawler are participating in the North Coast herring season as compared with 132 motor boats and one trawler last year. The increase reflects the higher hopes roused by last summer's catch which was higher than that of the previous year.

Note: Values converted on basis of 16,26 kronur equal US\$1,



India

NEW SHRIMP GROUND FOUND OFF COAST: The discovery of a rich new shrimp ground, extending 140 miles along India's Malabar coast, is reported by the Food and Agriculture Organization (FAO). The discovery, said an FAO expert in Rome, has already led to the start of a shrimp trawling industry and shrimp freezing for domestic and export trade. With other developments taking place on India's east coast, this has created a demand among Indian fishermen for mechanized boats, nylon nets, and other modern fishing gear.

An Icelandic master fisherman who has been working in Madras State since 1954 said he discovered the new shrimp ground while trawling with a 22-foot FAO boat. The shrimp run in a four-mile-wide strip about 140 miles long, average 4 to 5 inches in length, and are being caught at a rate of 100 pounds per hour's trawling with a 10 horsepower open skiff, he said. Fishermen could vastly increase their catches if they had mechanized boats, and could fish for shrimp in midwinter and spring as well as in the summer season when shrimp are caught in traditional bag nets while schooling on the surface.

Twenty 30-foot boats, designed by FAO naval architects, are nearing completion, he said, and the Madras State government has drawn up a five-year program of

fisheries' development which includes construction of mechanized boats. A private fish-processing company has leased a government freezing plant at Calicut and started a domestic and export trade in frozen shrimp.

The new shrimp ground is described by the Icelandic master fisherman as "a veritable gold mine.... I loaned our FAO boat to five fishermen I had trained and they caught 11,306 pounds of shrimp and fish from March 21 to April 18."



Italy

MARKET FOR IMPORTED FISHERY PRODUCTS: Greatly improved economic conditions, particularly in the last two years, plus the desire of the Italian Government to maintain a liberal trade policy, have recently resulted in the liberalization of additional products from the dollar area, including dried, salted and smoked fish. Fish falling within these categories may now be imported into Italy without import licenses or dollar allocations.

Canned fish, including salmon, is still on the list of restricted items. However, it is expected that sufficient dollars will again be made available to cover canned salmon for the 1956/57 season.

The Italian fishing industry, encouraged by various forms of Government assistance, has made slow but steady progress in modernizing its fishing fleet and

improving shore facilities since 1945. However, the quantity of fish taken in recent years has shown little variation and total 1955 landings of 194,747 metric tons were only 155 tons above those of 1954.

In postwar years, Italian fishing operations on the most prolific fishing grounds in the Adriatic, adjacent to the coast of Yugoslavia, have

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Table 1 - Italy's Imports of Fishery I		
Product		ntity
Troduct	1955	1954
	(Metri	ic Tons)
Salted cod	55,137	43,330
Stockfish	6,845	6,406
Fresh & frozen fish	33,083	22,988
Herring, salted & smoked	4,202	4,080
Pilchards, salted	279	853
Anchovies & sardines, salted	797	975
Crustaceans & molluscs	2,490	1,940
Other fish, fresh, salted, or smoked	97	38
Salmon, canned	1,528	1,394
Sardines and anchovies, canned	10,640	11,616
Tuna, canned	7,435	8,037
Other fish, canned	5,379	4,451
Total	127,912	106,108

been restricted. In recent months, however, a Fisheries Agreement entered into between Italy and Yugoslavia has established the right of Italians to fish in designated zones of Yugoslav waters under certain conditions. At present, the agreement is only provisional and subject to ratifications, but the Italian fishing industry hopes that it will permit greater freedom to operate in these rich Adriatic waters and result in increased catches.

Italy's total imports of fish during 1955 rose 20.5 percent above 1954, largely because of increased purchases of salted cod and fresh and frozen fish. Most of the frozen fish imports consisted of tuna supplies by Norway and Japan for local canneries.

Italy's 1955 imports of salted cod from Canada showed a 19 percent decrease as compared with 1954. Canada's main competition comes from the heavy salted

dried fish from France. Most of the salted cod imported from countries other than France and Canada is wet-salted and is sold on the local market as such. Because

Table 2 - Italy's Imports of Salted Cod, 1954-55					
Country of Origin	Quantity				
Country of Origin	1955	1954			
	(Metric Tons).				
France	17,543	8,326			
Iceland	14,735	12,467			
Denmark	7,488	11,315			
United Kingdom	5,695				
Canada	3,464	4,276			
West Germany	2,448	1,160			
Other countries	576	2,056			
Italian deep-sea fisheries	3,188	3,730			
Total	55,137	43,330			

of its low price, French fish has made serious inroads into sections of the Italian market which were formerly considered strongholds for hard-dried light-salted cod and, in particular, for Newfoundland shore fish. Imports of French fish have more than quadrupled since 1953, although consumer demand for the French product appears to be lessening.

Slow sales and larger-than-usual stocks at the turn of the year caused considerable pessimism in the Italian salt cod trade. However, severe weather conditions during February and March curtailed local fishing operations and demand for salt cod again became active. Sales have continued to be fairly brisk and it is expected that, for the most part, stocks will be disposed of by the beginning of the new season. By that time, import demand should be normal.

Canadian canned salmon may encounter increased competition but there should be no difficulty in maintaining sales provided prices remain competitive. Canada's exports of fish to Italy have usually consisted of salted cod and canned salmon, but now all fish coming within the categories of dried, salted, or smoked may be imported freely from dollar areas, states the July 7 (Canada) Foreign Trade.



Japan

NORTH PACIFIC FACTORYSHIP SALMON CATCH THROUGH JUNE 5: The 1956 Japanese salmon factoryship expedition of 12 factory ships, 315 catcher boats

and 60 scout boats had caught 7,269,744 salmon (number of fish) through June 5, 1956, according to the June 7 issue of Hokkai Suisan, a Japanese periodical. This total is lower by 24.3 percent than the 9,609,094 fish reported through the same date in 1955. As of June 5 fishing operations had not begun in the Okhotsk Sea.

Japanese Factoryship Salmon Catch in North Pacific Through June 5						
Species						
	(No. of Fish)					
	Sockeye					
Pink		529,955				
Chum		5,332,848				
Coho	45					
Spring	3,371	3,802				
Other	2,000	3,000				
Total	7,269,744	9,609,094				

* * * * *

SALMON AND CRAB CATCHES REPORTED GOOD: Despite earlier pessimism, Japanese salmon fishing fleets in the Russian restricted area are faring very well and it appears possible that the limit will be caught by the August 10 deadline. One fleet of 27 catcher boats is reported to have caught just under their season limit by July 24. This fleet, however, is operating at 51 18 north latitude, 1570 west longitude, an advantageous location because large numbers of fish pass through the Kurile Straits. There is more optimistic feeling concerning the salmon fishing in the Russian restricted area than there was earlier, but over-all figures for the catch to date are not available.

The crab catch in the Bristol Bay area was last reported to be favorable and crab fleets have reported packs near the goals set for this season, states a July 27 United States Embassy dispatch from Tokyo.

FISH MEAL PRODUCTION AND EXPORTS: There was a drastic reduction in the amount of fish meal produced in Japan during the postwar period when every fish caught was needed for human consumption because of the food shortage. How-

ever, in 1952 production of fish meal (table 1) began to pick up and exports were resumed. No official statement for the production in 1955 has been issued as yet. The lack of exports to the United States during 1954 and 1955 has been attributed to the fact that shipments were diverted to Europe to take advantage of the low freight rates prevailing as a result of the freight war that existed between the Japanese Homeward Freight Conference and the

Table 1 - Japanese Fish Meal Production for					
Animal Feeding and Fertilizer, 1953-54					
Туре		1953			
	(Metric Tons)				
Herring scrap	1,600				
Sardine scrap	7,600				
Fish scrap	35,800	27,500			
Dried sardine	500	.,			
Fish meal	19, 300	n.a.			
Others	38, 900	41,500			
Total	103,700	95,600			

Mitsui Steamship Company Ltd., but recently this disagreement was resolved,

At the present, exportation of fish meal has been halted as of July 1, 1956, because of the temporary withholding of licensing approval by the Fishery Agency of

Table 2 - Japanese Exports of Fish Destination, 1953		by Cou	ntry of
Country of Destination	1955	1954	1953
	(IV	Tetric T	ons)

Destination, 1000 00					
Country of Destination	1955		1953		
	(Metric Tons)				
Belgium · · · · · · · · · · · · · · · · · · ·	441	-	498		
France	-	162	-		
West Germany	2,792	-	-		
Switzerland	-	-	98		
Netherlands	-	-	200		
United States · · · · · · · · · · · · · · · · · · ·	-	-	2, 225		
Philippines	122	269	366		
Taiwan	23	-	-		
Hong Kong	34	123	81		
Mexico	-	189	-		
Singapore	-	62	46		
Ryukyus	31	78	169		
Total	3,443	883	3,683		
1					

the Japanese Ministry of Agriculture and Forestry, although shipments under long-term contracts are allowed to continue. The reason for the stoppage is traced to the current shortage of fish meal that resulted from the low catches of fish and which brought a sharp rise in price. However, the price of fish meal has dropped and the producers of fish meal are seeking the abolition of the restriction. It was expected that licensing

of exports would commence again in September of this year.

Production of fish meal in Japan consists of two kinds. There is the white-fish meal made from white meat fish such as cod, Alaska pollock, Atka mackerel, etc.;

most of this fish meal is used for animal feeding and exports. The other kind is the brown fish meal made from red-meat fish such as sardines, herring, and saury

pike, and used more for the manufacture of fertilizer. According to the Japan Fish Meal Exporters Association, production of fish meal is not expected to reach prewar production for some time to come. The increasing restrictions imposed on Japanese fishermen by neighboring countries have narrowed the areas where they may still catch fish and has led to a material reduction in the amount of fish landed available for fish

Table 3 - Comparison of Japanese Fish Meal Production and Exports in Prewar and Postwar Periods				
Year	Total Production of Fish Scraps &			
2 5 4 7	Meal		U.S. Only	
	(Metric Tons)			
Prewar:				
1937	333,000	89,100	56,200	
1936	450,000	67,400	47,200	
1935	374,000	57,900	32,800	
Postwar:				
1956 (JanJune)	n.a.	7,900	n.a.	
1955 est	135,000	3,443	-	
1954	103,700	883	-	
1953	95,600	3,683	2,225	
1952	95,000	627	48	

meal production. It is, therefore, no longer profitable for a large fishing company to operate a large fish meal plant. Production is consequently drifting into the hands of small enterprises who produce fish meal when the weather in a particular locality is not suitable for processing fish into salted or dried products or when a large catch is landed in an isolated area. The recent restriction on exports has also discouraged fish-meal production. The decline in fish meal from the prewar period may be seen in table 3 which contrasts the production and exports in the prewar and postwar periods.

* * * * *

REVIEW OF JAPANESE FISHERIES, 1955: A large-scale recovery of Japan's prewar position and a growing awareness of her stake in international measures for conservation of resources and stabilization of the industry marked the year 1955 in the fisheries of Japan.

The overwhelming majority of the Japanese people live on the seacoast of their island country. With agriculture limited for the most part to the narrow belt of land between the shore and the nearby mountains, the Japanese have tended to view the vast expanses of the seas which stretch out all about them as their pasture lands, their "West," their ever-expanding frontier encompassing the territory necessary to produce the food needed by their ever-increasing population. In the words of a Japanese familiar with both ways of life, the oceans are to the Japanese people what the wheat fields of the midwestern plains are to the American people. Fish is not a once-a-week food to the Japanese nor a substitute to be bought when the price of meat is high; 80 percent of the animal protein content of the Japanese diet comes from fish, and the health of the people would deteriorate rapidly if they did not have the resources of the seas at hand.

The total catch of all Japanese marine fisheries in 1955 was about 5,150,000 metric tons (about 11.3 billion pounds), compared with about 4,650,000 tons in 1954 and about 3,500,000 tons in 1938. While the 1955 catch represented an increase of about 10 percent over the figure for the previous year, there were notable increases and decreases in the catch of individual species. The salmon catch, for example, was about three times that for 1954, and the catch of saury pike was up 72 percent. The herring catch, on the other hand, continuing its downward trend, was only about one-third of the 1954 level and 15 percent of the 1952 catch, states a July 13, 1956, dispatch from the United States Embassy in Tokyo.

Exports from Japan in 1955 of fish and fish products totaled 155,108 metric tons, valued at US\$75.6 million, an increase of 10 percent in volume and 2 percent in value over 1954. Exports of other marine products (including whale oil, pearls, fish oil, agar-agar, shells, dried seaweed, and seed oysters), amounted to 64,680 tons, valued at US\$30.3 million, which was 2.5 times the 1954 exports in volume and 1.5 times in value; the increase was accounted for almost entirely by shipments of whale oil, which rose from 9,000 to 45,000 tons.

Tuna: United States interest in Japanese fisheries was centered in 1955 on the tuna and salmon industries. For several years prior to 1955 shipments of frozen tuna, particularly those of albacore (white meat) tuna, from Japan to the United States had been increasing at a rate which caused considerable alarm to American fishermen. During the first five months of 1955 Japanese Government approvals for the shipment of albacore totaled almost 25 percent more than those of the same period of 1954, and by June 1 the situation in the California tuna fishing and packing industry was acute. While the Japanese Government controlled the price of albacore for export under a "check price" system which was designed to equalize the cost of Japanese fish with the current American price, it was reported that the financial difficulties of some Japanese firms were forcing them to violate the law and sell below the check price, which in turn aggravated the situation. In the face of mounting public pressure in the United States for controls on the import of Japanese tuna, the Japanese industry undertook to put its own house in order. In June a cooperative association was formed to control the export of frozen albacore, and thereafter all orders were channeled through that association. The check price was reduced from US\$300 a short ton, which was considered too high to be enforced, to US\$270 a ton. In order to hold the line firmly at this price, the association guaranteed to buy albacore at US\$270 from any exporter who was forced to sell because of financial difficulties, thus ending the pressure for sales below the check price.

The association also established a ceiling on exports of albacore for June and July 1955 of 15,000 tons, as compared with approximately 10,000 tons approved for export during the same months of 1954. This figure was considered unreasonably high in the United States, and protests continued. Moves were started, with the backing of the American tuna fishing industry and certain of the canners, for Congressional action to limit imports of albacore, or for the imposition of a customs duty. The matter was further complicated, however, by the fact that a number of tuna canners located in the Pacific Northwest are not served by the American fishing fleet but depend mainly on Japan for sources of raw fish and so were opposed to restrictions.

As the summer fishing season progressed it became evident that the size of the albacore catch would not be as great as had been expected, and Japanese Government approvals for the export of albacore to the United States totaled only slightly over 9,000 tons, far short of the association's quota and less than the total for the same period of 1954. The same tendency continued throughout the rest of the year, and export approvals for the last seven months of 1955 were only a little over 18,000 tons, or 1,500 tons less than the same period of 1954. The total for the year ended up about 1,000 tons more than 1954. While this total still represents more of a share of the United States market than may be considered reasonable by the American tuna fishing industry, it nevertheless marked a halt in the previous rapid rate of increase.

During 1955 the Japanese Government continued to place restrictions on the building of new tuna boats, new licenses were limited, and the operating period, tonnage, and catch of the boats now in use were continued under regulation.

The concern of the United States with the Japanese tuna industry is solely one of trade, affecting Japanese shipments of canned and frozen tuna to the United States.

The United States and Japanese fishermen have no conflict over the catching of tuna, since they operate in different areas of the seas.

Salmon: The United States interest in the Japanese salmon industry, on the other hand, is dual: to a large extent United States and Japanese fishermen compete for the same fish, while the canning companies compete for markets. The American (and Canadian) salmon fisheries, moreover, are fundamentally different from those of Japan. The United States and Canada maintain close scientific control over the rivers on the North American continent where the salmon return to spawn, and the catch is taken off the mouths of these rivers in amounts calculated to allow the optimum number of spawning salmon to escape into the rivers. The Japanese have extremely few salmon-producing rivers, and conduct their fishing by means of nets on the high seas. It is the United States contention that the salmon produced from North American rivers should be reserved for catching by United States and Canadian fishermen under controlled conditions, and this principle was recognized in the Japan-Canada-United States Tripartite North Pacific Fisheries Convention. Under that Convention, the Japanese agreed to refrain from fishing for salmon in the area east of a line located approximately at 175° west longitude, which was taken tentatively to mark the limits of the area inhabited by salmon of North American origin.

The Japanese salmon fisheries were signally successful in 1955. Twelve cannery ships, each accompanied by a fleet of fishing vessels, operated in the North Pacific to the west of the Convention line, while two other fleets fished in the Okhotsk Sea for the first time since the end of the war. Though the Japanese salmon catch was still considerably below prewar levels, it was about three times as large as that of 1954, which in turn had been much larger than the 1953 catch. The total pack of canned salmon reached 1,780,000 cases, nearly triple the 1954 figure of 625,000 cases.

During the 1955 season the salmon runs in a number of North American rivers were very poor, giving rise to a belief on the part of some American fishermen that the Japanese high seas catch had taken its toll of the North American salmon, in spite of the fact that the Japanese fishing had been conducted well to the west of the Convention line. Research was being currently conducted under the terms of the Convention to trace the migration of salmon and to establish more definitely whether a line could be drawn to divide the North American salmon from those of Asiatic stock, but the results of this research were not yet positive enough to show whether the salmon taken by the Japanese were in fact of North American or Asiatic origin. The Japanese fishermen believed that the salmon which they were catching during the 1955 season were in the process of migrating toward the Asiatic continent, and it was a fact that the Japanese North Pacific fleets moved constantly westward as the season progressed.

It was under these circumstances that the 1955 meeting of the International North Pacific Fisheries Commission, established under the tripartite Convention, opened in Tokyo in October. The Commission's committee on biology and research met on October 24, followed by the full annual meeting which began on October 31 and ended on November 5. The ideas of both the North American and Japanese sides were given full expression at these meetings, and although no final conclusions were reached on the main topic of discussion, the delegates obtained a clearer understanding of the problems being faced on both sides.

The Japanese salmon industry also experienced difficulties in selling the increased pack of canned salmon which resulted from the bountiful catch. The poor catch on the North American side made it possible for the Japanese to sell about 500,000 cases in the United States and another 150,000 cases in Canada. In 1954 Japan had sold somewhat over 200,000 cases of canned salmon to the United Kingdom, which was considered Japan's prime market. The Japanese hoped to triple

this amount to over 700,000 cases in 1955, and negotiations towards that goal were included in the United Kingdom-Japan talks on their over-all payments agreement. The British were unwilling to consider this large increase, in spite of efforts made directly with the British Government in London by the Japanese Minister of Agriculture and Forestry. A compromise was finally reached, however, which provided for exports to the United Kingdom of somewhat over 400,000 cases, or double the previous year's market.

Crab: In 1955, as in previous years, the Japanese sent a fleet to Bristol Bay to fish for crab. Two additional exploratory crab fleets were also sent in 1955 to the Okhotsk Sea. No Japanese fishing had taken place in the Okhotsk Sea since the end of World War II, but the 1955 expeditions showed that the possibilities for crab fishing there were excellent. The total pack of the three crab fleets was about 210,000 cases, of which two-thirds were taken in the Okhotsk Sea.

An irritating and potentially disruptive incident occurred in Bristol Bay when the United States and Japanese crab fleets came into conflict over the interpretation of an informal agreement establishing the distance to be maintained between fleets. A temporary amicable solution was reached, and the matter was discussed further at the time of the Tokyo meeting of the International North Pacific Fisheries Commission. Arrangements were then made by which each fleet will keep the other notified of its position and fishing operations, and maintain a specified distance from the area being fished by the other fleet.

Coastal Fisheries: While the interest of other countries is mainly in Japan's high-seas fisheries, such as those for tuna and salmon, the Japanese people themselves are more concerned in their daily lives with their coastal fisheries, in which 88 percent of the fishermen are engaged but which produce only 44 percent of the catch. Much of Japanese fishing is done by small groups of men in light boats within sight of the shore; while this type of fishing is convenient from the point of view of time spent away from home and availability of the fishermen for other work on days when fishing is not feasible, it is highly inefficient in yield per man hour. In August 1955 the Japanese Government issued a "White Paper" on the coastal fisheries in which a number of moves were recommended for the improvement of this phase of the fishing industry. In prewar days, according to the "White Paper," the coastal fishermen accounted for three-quarters of Japan's total catch. As larger and more efficient vessels have been built, however, and have ranged farther and farther from Japan in search of better fishing grounds, the balance has swung in favor of the high-seas operations. The Japanese Government hopes, over a period of years, to make it possible for coastal fishermen to band together, build larger boats, operate where the best fishing grounds can be found, and utilize scientific fishing methods to increase their catch relative to the time and energy expended.

Fisheries Relations with Other Nations: Relations in the fisheries field between Japan and the other nations of the Far East continued to be difficult in 1955. The Soviet Union has since the end of the war made a practice of seizing Japanese fishing boats which wander over the line separating Japan proper from Soviet-held territory. The number of such seizures in 1955 was 125, double the 1954 figure. The same number of ships was returned to Japanese custody, however, leaving the number still in Russian hands at the end of the year the same as it was at the beginning, 46. A total of 1,103 Japanese fell into Soviet hands in this manner, of whom 1,092 were allowed to return during the year, the other 11 being added to the total of 34 who were in Soviet custody at the beginning of the year.

It will be recalled that during the Allied Occupation of Japan the Japanese fishermen were kept within an area close to Japan bounded by what was called the "Mac Arthur Line." When, shortly prior to the coming into force of the Peace Treaty in April 1952 the "MacArthur Line" was abolished, a new line off the coasts of Korea was proclaimed by President Syngman Rhee of the Republic of Korea as the line

setting off those portions of the high seas in which the people of Korea had a special interest, and which the Korean Government intended to reserve for exploitation by Koreans. Japanese fishing boats were warned that crossing the "Rhee Line" would be a violation of Korean law, and that violators would be apprehended and punished. At the beginning of 1955, 88 Japanese vessels and 242 men were being held in the Republic of Korea for violation of the "Rhee Line." During 1955, 30 more boats and 498 men were seized, of which one boat and 15 men were released during the year; the totals still in custody at the end of 1955 were therefore 117 vessels and 725 men.

Most of the boats and fishermen held in Korea are from the Kyushu and Southern Honshu areas of Japan, and the public feeling in those areas against the Republic of Korea ran high in 1955.

The communist Chinese Government in Peiping did not lose any time after coming into power on the mainland before beginning to seize its share of Japanese fishing boats. While there was no specific area mapped out by the Chinese into which Japanese vessels were forbidden to enter, such vessels as ventured into waters in which Chinese gunboats happened to be operating frequently found themselves fired upon and captured. At the beginning of 1955 there were 104 Japanese boats in communist Chinese custody. No seamen were being held, however, since the Chinese had previously returned the crew members.

The communist Chinese tactics during 1955 were different, however. The Japanese Government maintains normal diplomatic relations with the Nationalist Chinese Government in Taiwan, and has no official ties with the Chinese communist regime. The opening of diplomatic ties with Japan has been and continues to be one of the major policies of the Peiping Government. In line with this policy, the communist Chinese in 1955 proposed a fisheries agreement with Japan under which the fishing vessels of each country would be able to operate in specified areas without fear of interference from the other country. The Japanese Government refused to participate in the negotiation of such an agreement, but the private fishing interests met with the Chinese and signed an agreement having many of the earmarks of a government-to-government treaty. Under this agreement the Japanese fishermen are not guaranteed the right to fish anywhere on the high seas without interference. but are allotted certain sections in the Yellow Sea and East China Sea in which to carry on their operations. Other parts of the agreement provide for safe harbors for fishing vessels on both sides and mutual recognition signals. In keeping with their new tactic, the communist Chinese seized only one Japanese boat in 1955, and both it and its 10-man crew were returned.

Although in past years Japanese fishing vessels have been subject to seizure by the Chinese Nationalist Government for violation of the regulations of that government, no such seizures took place in 1955. The 30 boats and 11 men held by the Nationalist Government at the end of 1954, however, continued to be held in custody.

The restrictions imposed by the Australian Government on the pearl-shell fishery in the Arafura Sea continued in force during 1955, and the Japanese pearl-shell fleet operated within the scope allowed by the Australian authorities.

From September 30 to October 14, 1955, Tokyo was the scene of the Sixth Annual Meeting of the Indo-Pacific Fisheries Council of the United Nations Food and Agriculture Organization. Representatives of 16 nations, including the United States, discussed problems relating to inland fisheries and fish culture, sea fisheries, and shrimp culture.

<u>Conclusion</u>: The Japanese by the end of 1955 had regained their prewar fisheries position insofar as the catch was concerned. The wartime interval and the years of the Occupation, however, had covered a period in which the international forces which bear on Japan's access to fishing grounds and to markets had shifted,

and Japan has not yet been able to complete its adaptation to the new situation. The world situation is such that it can be expected that difficulties between Japan and certain other countries will continue, but the preeminent position of Japan among the fishing nations, and the economic need of Japan for foreign trade, will be powerful factors in determining Japan's policies towards the rest of the world.

* * * * *

NORTH PACIFIC WHALING EXPEDITIONS, 1956: One of the two Japanese fleets which will participate in the annual North Pacific whaling operations departed from Yokohama on May 8. The fleet, jointly operated by three major Japanese whaling companies, consists of an 11,448-ton mothership, the Kyokuyo Maru, 8 catcher boats (including a scout boat), 4 refrigerated vessels and 15 transport vessels. Whaling will be carried out until the end of September.

The catch for this fleet is estimated at 2,060 whales including 1,560 baleen whales (limited by law to 1,560 baleen whales or 800 blue-whale units) and 500 sperm whales. The 1955 catch was 1,568 baleen whales and 585 sperm whales.

On the basis of the estimated catch, production will amount to 29,665 metric tons valued at \(\foatigma 2.2 \) billion (about US\(\foatigma 6.1 \) million), divided as follows; baleen oil 10,948 tons, sperm oil 3,500 tons, whale meat 15,217 tons.

In 1955 this fleet's production amounted to 26,887 metric tons of products of which 15,192 metric tons were oil.

The second Japanese fleet will participate in North Pacific whaling later in the season but will limit its catch to sperm whales. Detailed plans for this fleet are not yet available but its catch last year consisted of 499 sperm whales which yielded 4,990 metric tons of products, states a June 4, 1956 dispatch from the United States Embassy in Tokyo.



Mexico

<u>VERACRUZ FISHERIES TRENDS</u>, <u>MARCH-JUNE 1956</u>: Veracruz fishermen on the east coast of Mexico caught 500 metric tons of mackerel in March and nearly as much in April 1956. In May the catch dropped to 229 tons. Little fishing was done in June. The catch in the second quarter of 1956 was valued at 2 million pesos (US\$160,000) ex-vessel.

Veracruz needs about 2 million pesos (US\$160,000) to recondition its refrigeration plant in order to preserve the catch and expand its fishing industry.

Within the next 5 or 6 months
Tabasco expects to see increased

Tabasco expects to see increased Spanish mackerel (Scomberomorus maculatus) ice production and the building of a refrigeration plant for the shrimp catch.

* * * * *

LAW ON EXPORTS OF SPINY LOBSTERS CLARIFIED: A Mexican official in the office of the Director General of Fishing of the Ministry of Marine informed the United States Embassy in Mexico on June 8 that the Mexican law relating to the exportation of spiny lobsters appeared in the Diario Oficial of March 12, 1956, and

it clearly states that the exportation of spiny lobsters caught between parallels 23 and 29 in the Gulf of California shall be entered through the port of Nogales at all time during the entire open season (Nov.1-April 15) in that area. He added that he saw no reason why the lobsters have to be exported exclusively through the port of Nogales during the general open season but that unfortunately the wording of the decree in the Diario Oficial specifies that spiny lobsters caught in the Gulf of California shall be exported through the port of Nogales during the entire open season for that area.

The official from the Ministry of Marine indicated that if there were sufficient pressure from the interested parties to get this provision of the law changed, the Mexican authorities would probably agree to do so. He pointed out, however, that the special authority conferred by this decree is temporary and expires on April 15, 1957, at which time presumably new regulations will be issued covering the exportation of lobsters from the Gulf of California.

* * * * *

PLANS FOR NEW SEAWEED PROCESSING PLANT: A Mexicali firm has announced plans to establish a US\$500,000 plant in Ensenada, Mexico, to process seaweed (Pacific kelp, Macrocystis pyrifera) for medicinal and industrial purposes. The firm, which is reportedly being formed wholly with Mexican capital, has been granted a concession for the purpose by the Ministry of Marine.



Netherlands

MARINE OIL MARKET: The Netherlands is probably the second largest distributor of marine oils in Europe. In spite of the fact that the population is only a small percentage of the population in

Germany, the distribution of marine oils in 1955 was quite large.

The Netherlands production of fish oil, whale oil, and sperm oil for the years 1949 through 1955 is shown in table 2.

The production of fish oil has increased from approximately 1,000 tons in 1949 to about 5,000 tons for the past 3 or 4 years. There are 3 sizable fish reduction plants in Holland and one very small one. The oil is produced principally from offal received from the curing of herring. There are some occasions when the catch is too great to handle and then whole herring are shipped to reduction plants. This is only done at times when the herring are unfit for food use. As in other countries the fish reduction plants are operated primarily to secure the fish meal. One of the reduction

Table 1 - Netherlands Distribution of		
Marine Oils		
	Metric Tons	
Exports:		
As such	3,789	
In margarine	7,967	
In cooking fats	1,497	
Other	423	
Total exports	13,676	
Consumption:		
In margarine	41,416	
In cooking fats	3,445	
Total edible con-		
sumption	44,861	
Technical use	938	
Waste	1,204	
Miscellaneous disap-	,	
pearances	2,277	
Ending stocks Dec. 31	14,506	
Total Distribution	77,462	

plants also is a renderer of tallow and grease. This firm also operates a refinery at a different location. Formerly it produced a grade of polymerized refined oil which was used in fish canning. It has discontinued polymerizing oil and now merely reduces the free-fatty acid content to 0.1 percent and bleaches the oil. This oil is then sold to hydrogenators for manufacture into oil suitable for use in margarine.

The surveyor was informed that in the Netherlands it is not customary to make mixtures of whale oil and fish oil in the hydrogenated form. These hardened oils

Table 2 - 1	Vetherla	nds Prod	uction of	Marine	Oils, 194	19-55	
Type	1955	1954	1953	1952	1951	1950	1949
			(N	letric To	ons)		
Fish oils	4,979	5,347	5,135	4,794	4,350	2,460	1,090
Whale oil $\frac{1}{2}$ /	5,679	15,376	17,345	15,752	15,505	13,248	17,967
Sperm oil $1/\dots$	77	1,016	30	-	422	606	558
Total	10,735	21,739	22,510	20,546	20,277	16,314	19,615
1/ Whale oil and sperm oil data represent those portions of the production by the Dutch whaler (Willem Barentsz) which were							
actually brought into the Neth	actually brought into the Netherlands and do not represent the total production by this whater.						

are sold separately and the margarine manufacturers make their own mixture. There is no great surplus of oils suitable for hydrogenation in the Netherlands. American menhaden oil is liked here in the Netherlands. There have been no com-

Table 3 - Netherlands Imports of Fats & Oils from Fish & Marine Animals by Country of Origin Country 1956 1954 1955 (Jan.-Mar.) of Origin ... (Metric Tons)... Belgium/Luxembourg 937 831 3,471 8,866 Great Britain France 391 230 Western Germany 768 794 Ireland 16 Iceland 900 1.759 404 2,267 3,532 Denmark 496 87 Czechoslovakia.... 276 27 Tangiers French Morocco..... 73 123 Port. East Africa 204 South-West Africa 28 Union of South Africa.... 521 860 2,408 United States 14,321 9,734 1,039 118 Peru 200 50 611 75 Japan 2,734 47 Australia 7,375 New Zealand 253 1,193 29,260 15,979 Total Imports 4.497 57,685 51,258 Source: Central Bureau of Statistics

plaints from those who have imported only directly from producers for the last two years.

There are two fairly large dealers in fish oil located in Rotterdam. These are old established companies. These companies cooperate frequently; buy and sell on joint account. They also deal in other fats and oils and maintain stocks in the Rotterdam area. Representatives from these two companies plan a joint trip to the United States later in the year to look into the menhaden oil situation. They have not bought very much oilthis season since they feel that the present price is still too high even though it has declined from \$224 per short ton to a level of \$213 per ton c.i.f. Rotterdam.

As in other countries in Western Europe, one interna-

tionally known firm handles the greater portion of both fish and whale oil used in the Netherlands. Some people have estimated that it controls between 80 and 90 percent of the business and its actions, of course, dominate the trading picture.

All established companies in the fat and oil business complained that since the war there has been a flock of new dealers that have entered the field. This has caused considerable fluctuation in prices, since frequently trading takes place between these operators rather than with actual consumers of the oil.

It is quite difficult to secure accurate figures regarding the actual use and consumption, and even the official figures issued by different branches of the Government vary. Practically all of the fish oil used in the Netherlands goes for edible

purposes. Discussions with the firm which represents the South African solexol plant owners indicated that sales for the past two years have been negligible and only occasionally do they sell one or two drums of the fractionated product.

Table 4 - Netherlands Imports of Whale					
Oil, Fish Oils, and Sperm Oil, 1/1949-55					
	Oil Total				
Year	Whale	Fish	Sperm	IOtal	
2/		(Metric	Tons)		
$1955\frac{2}{}$	33,800	15,100	3,360	52,260	
1954	46,850	20,670	2,890	70,410	
1953	47,220	8,720	2,120	58,060	
1952	29,960	16,780	1,590	48,330	
1951	42,840	16,310	1,630	60,780	
1950	36,300	24,960	2,750	64,010	
1949	27,840	5,130	1,930	34,900	
1/ Includes su	ipply from Du	tch whaler W	illem Bare	entsz.	

Source: Marketing Board for Margarine, Fats and Oils.

Table 5 - Netherlands Whale Oil in Mar- garine, 1948-55					
Year	Whale O		Total Prod. of		
1 Car			Margarine		
	%	. (Me	tric Tons).		
1955	24.5	41,416	206,101		
1954	21.7	35,703	200,225		
1953	22.0	35,049	193,058		
1952	19.2	29,233	184,574		
1951	23.7	34,082	173,117		
1950	24.4	34,894	172,169		
1949	12.3	15,026	146,489		
1948	21.1	18,757	107,256		
Source: 1	Source: Marketing Board for Margarine, Fats, and Oils,				

People engaged in paint manufacturing in the Netherlands prefer linseed oil which they claim produces a better grade of paint more suited to the damp climate of the Netherlands.

Everybody interviewed indicated that there would be no difficulty in selling the entire surplus production of menhaden oil from the United States this year and felt that the use of fish oil in Western Europe would grow since the population is increasing and the per capita consumption of fat products is also increasing. Increase in the production of palm fats, whale oil, and other liquid oils generally is not increasing at the same rate as the increase in consumption.

This is one of eight reports on a survey undertaken by the U. S. Fish and Wildlife Service of markets for United States-produced oils with emphasis on Western Europe.

Note: See Commercial Fisheries Review, August 1956, p. 47; also see pp. 58, 66, 70, 71, 90, 96, & 99 of this issue.



New Caledonia

MARINE PRODUCTS INDUSTRY: Although the waters of New Caledonia abound in marine life, the only marine product which is exported is trochus shells. In spite of the firm price for trochus shells—about 50,000 francs (US\$785) a ton in 1955—the amount of trochus shells exported during the year totaled only 723 metric tons as compared to

New Caledonia Fishery Products Imports by Country of Origin, 1954-55						
Country	Quar	ntity		Va	lue	
of Origin	1955	1954	1955	1954	1955	1954
	(Me	tric	(CFPI	Francs	(U	S\$
	To	ns)	1,00	0)	1,0	00)
France	15.6	19.2	1,195	1,286	19	20
French Union	28.1	53.7	1,533	1,937	24	30
Australia	12.5	11.0	985	797	15	13
United States	68.3	42.2	2,409	1,603	38	25
Other Countries	65.9	96.6	1,944	2,581	31	41
Total	190.4	222.7	8,066	8,204	127	129

880 tons in 1954. This decrease is caused by depletion. During the year an expert of the French Institute of Oceania (Institut Français d'Oceanie), a scientific research organization with headquarters at Noumea, began studies as to how trochus stocks may be regenerated.

Providing fish for local consumption does not occupy a large number of fishermen and demand for fish was supplemented in 1955 by the importation of canned fish

valued at 8,066,000 francs (US\$126,600). It appears that the fishermen themselves limit the amount of fish caught in order to maintain prices.

A small fish cannery (established in 1951) on the northern tip of the Island, has not been very successful due to the irregular supply of fish.

Note: Values converted on basis of CFP franc equals 1.57 U, S, cents.



Norway

MARINE OIL MARKET: Norway is the largest fish-oil producing country in Europe and the production consists principally of herring oil. It is probable that the production will continue to grow since, like in Denmark, the trade feels that

Table 1 - Norway's Marine Oil Pro- duction, 1953-55				
	Metric Tons			
1955	71,000			
1954	95,000			
1953	58,000			

European participation in whaling will probably decline on account of the greatly increased costs of operating whaling units. The Norwegians have done a lot of research work in the handling and refining of fish and whale oils. Whale and fish oil constitute about 60 percent of the fat content of margarine propagation.

duced in Norway and the quality of the margarine is such that it has been exported to many countries with success. It is also used as shortening in Norway since the taste of the margarine on heating does not become objectionable.

It is anticipated that the total production of fish oil in Norway for the year 1956 will be approximately 100,000 metric tons. The refiners of oils in Norway have

Table 2 - Norway's Crude Herring Oil Ex-					
ports by Destinati	on, 1954-	55	ports by Destination, 1954-55		5
Destination	1955	1954	Destination	1955	1954
	(Metr	ic Tons)		(Metric	Tons)
United States	283.1	260.4	Spain	0.0	157.4
Poland	350.7	519.8	Italy	547.0	831.1
Czechoslovakia	2,314.0	1,089.9	Western Germany	2,887.2 1	,930.0
Spain	353.4	0.0	Denmark	1,032.2 1	,346.7
Italy	146.9	112.6	France	414.4	236.7
Western Germany	104.6	1,688.9	Netherlands	10.0 1	,163.8
Belgium & Luxembourg.	280.5	216.9	United Kingdom	100.0	0.0
Denmark	0.0	1,096.3	Brazil	0.0	165.5
France	289.8	26.5	All Others	26.5	166.3
Netherlands		1,277.6	Total	5,117.3 5	,997.5
All Others	554.3	418.3	made an agreement wit	h the fight	noduo-
Total	4 871 4	6.707.2	made an agreement wit	ii tiie iisii .	reduc

duction so that there will probably be no exports of crude fish oil for the year 1956. All of the oil produced to date has been sold. Norway has some bilateral agreements with countries behind the Iron Curtain for the delivery of processed fish oils and refined hydrogenated fish oil will be exported to cover these commitments.

There is very little of the fish oil used in Norway for industrial purposes. One firm operates a Solexol plant, but this is used principally for the production of a grade of oil from the poorer grades of oils (both domestic and imported) that will refine and bleach in a satisfactory manner for edible purposes. The other fraction of the oil is used in the production of synthetic resins of the alkyd type under Reicholt license. This company handles the largest production of finished products in Norway.

The other Norwegian refiners of fish oil buy lower grade fish oils from Angola, Portugal, Morocco, etc. at cheap prices and treat them by special refining methods

Table 4 - Norway's Edible & Inedible Polymerized & Refined Marine-Animal Oil Exports by Destination, 1954-55			
Type & Destination		1954	
Edible:		c Tons)	
Finland	23.5	30.8	
Sweden	63.3	173.0	
Western Germany	518.2	282.1	
Peru	23.8	9.9	
Denmark	0.0	80.0	
All others	0.0	67.9	
Total edible	628.8	643.7	
Inedible:			
France	0.0	20.0	
Netherlands	0.0	10.4	
Egypt	2.0	0.0	
Total inedible	2.0	30.4	

Table 5 - Norway's Sulphonated Marine-
Animal Oil Exports by Destination,
1954-55

1954-55		
Destination	1955	1954
		c Tons)
Finland	109.5	142.0
Sweden	34.2	37.9
Denmark	21.7	25.6
Netherlands	2.8	10.0
All others	41.1	19.0
Total	209.3	234.5

before mixing them with Norwegian herring oil for hydrogenation.

On account of the monetary situation in Norway, it is desirable that Norway exist as much as possible on its own

production of fats and oils, using its surplus of fish oil for trading purposes with other countries. The type of oil used for industrial purposes consists principally

from Marine-Animal Oils by

Destination, 1954-55			
Destination	1955	1954	
	(Metric Tons)		
Finland	366.2	349.6	
Poland	. 0.0	498.3	
Spain	351.2	800.7	
Sweden	881.9	868.8	
Western Germany	411.6	2,508.4	
France	426.5	239.4	
Belgium & Luxembourg	113.1	142.1	
Netherlands	169.2	30,6	
United Kingdom	75.4	135.1	
Austria	28.7	202.3	
Eastern Germany	84.0	155.0	
Denmark	19.4	125.8	
All others	171.9	533.8	
Total	3,099.1	6,589.9	

Table 6 - Norway's Exports of Fatty Acids | Table 7 - Norway's Exports of Hardened Edible Fat & Technical Fat from Marine

19	55 1954
(IM	letric Tons)
Edible Fat Total 66,4	46.8 70,896.7
Technical Fat Total. 7,0	44.2 4,883.1

of seal oil, used in the leather industry, as well as being treated to produce suitable textile oil, etc.

Statistics in Norway except for production and imports and exports of crude fish and whale oils are not very easy to obtain. Those issued officially by the Government covering the refined, hydrogenated and other manufactured products are lumped in categories which include vegetable and animal fats and oils. Due

to cheap electric power in Norway, the cost of producing hydrogen is quite low and the hydrogenation of fats and oils is very well developed.

As is the case in Sweden, combinations of whale oil and fish oil in varying proportions are refined and hydrogenated for the manufacture of margarine and usually sold on a specification basis under a particular trade name.

The polymerization of fish oil in the manufacture of edible liquid fish oil was originally started in Norway and a very large production was built up. Since the prohibition of the use of polymerized fish oil in Germany for edible purposes, this business has dwindled greatly and we were informed that it now consists of only a few hundred tons a year compared with thousands of tons in past years. The use of refined fish oil in fish canning has been nearly all replaced by edible vegetable oils. There are still one or two small canners who use fish oil since they feel that if there is some reversion to the original fish flavor it will not be noticeable in the finished canned fish

The price of fish oil usually is kept below that of whale oil and though it may vary during the year, unless there is some special circumstance, it must remain lower than whale

Table 8 - Norway's Ex Cleared Cod-Live Destination, 195	r Oil by	Cold-
Destination	1955	1954
	(Metri	c Tons)
Finland	110.2	133.3
Yugoslavia	132.5	83.5
Czechoslovakia	393.0	429.5
Greece	105.2	137.1
Italy	223.2	248.0
Switzerland	121.6	111.5
Western Germany	209.4	285.7
France	108.6	112.4
Netherlands	655.5	760.0
Other Eur. Countries .	508.1	463.4
Canada	221.4	145.9
United States	1,348.9	938.3
Brazil	214.5	307.9
Indonesia	162.7	59.0
All others	674.8	792.1
Total	5,189.6	4,986.6

Table 9 - Norway's Exp Fish-Liver Oil by Des		
Destination	1955	1954
		c Tons)
Finland	291.5	277.8
Italy	637.6	600.2
Switzerland	300.5	471.9
Sweden	912.2	1,193.6
Belgium & Luxembourg	120.4	166.1
Denmark	1,098.7	1,736.5
Netherlands	558.7	710.7
Other European		
Countries	336.9	629.9
Mexico	133.6	134.1
Brazil	52.6	178.2
All others	343.6	430.9
Total	4,786.3	6,529.9

oil because the cost of refining and hydrogenation is greater than in the case of whale oil with which it competes.

Interest was expressed in the type of fish oil that is produced in the United States and shipped from Gulf ports. The Norwegians indicate that this oil has in their experience a lower iodine value and can be refined and hydrogenated to produce a product comparable to their refined hydrogenated herring oil. There was no tobis (sand eel) oil produced in Norway.

Table 10 - Norway's Exports of Other Fish-Liver Oils by Destination, 1954-55 1955 1954 Destination (Metric Tons) United States 428.41 421.1 471.8 218.2 Sweden 199.5 446.9 Western Germany 1,375.5 886,8 144.5 180.4 Austria Belgium & Luxembourg... 80.0 80.5 Denmark 36.5 255.4 France..... 633.9 402.8 Netherlands 351.8 486.1 United Kingdom 121.5 847.0 Other European Countries 743.9 1,072.6 Mexico 257.3 258.5 Brazil 116.0 414.9 All others..... 96.2 324.2 Total 5,056.8 6,295.4

There have been very large investments in fish-reduction factories as well as additional vessels for fishing for herring for these factories in the past two or three years. The Government has assisted by grants and loans in this program.

Unlike Denmark and the Netherlands, Norway fishes for herring on the Norwegian coast starting at the north and fishing down the west coast as the herring move south. The bulk of the herring is caught in the first six months of the year and it is interesting to note that in spite of the large amount of herring used for food in Norway, between 80 and 90 percent of the various types of herring caught go to the fishreduction plants. It appears that there

are three distinct kinds of herring caught on the Norwegian coast, including the so-called "winter herring" which does not have too high an oil content, the "fat herring" which comes later in the year after the fish have had better food, and the "small herring" which is young and soft and is not usually suitable to any great extent for food.

It is significant that in Norway, fish oil is looked upon as a very important edible fat or oil while we in the United States look upon our fish oils as being principally suited for industrial uses. It is probable that because there are only very small quantities of vegetable-oil seeds raised in Western Europe and requirements must be filled through importation of fats and oils or oil seeds from other countries that research on fish oil has been conducted and refining and hydrogenation methods developed that are particularly adapted to these peculiar oils.

It is the consensus that there are only about 30,000 tons of whale oil unsold and since all of the Norwegian crude fish oil is committed, the market will be stable for the balance of the year.

This is one of eight reports on a survey undertaken by the U.S. Fish and Wildlife Service for United States-produced oil with emphasis on Western Europe. Note; See Commercial Fisheries Review, August 1956, p. 47; also see pp. 58, 66, 70, 71, 87, 96, & 99 of this issue.



CANNED BONITO EXPORTS THROUGH APRIL 1956: Production of canned bonito in Peru for the season, which ends usually in April, amounted to between 1.4 and 1.5 million cases, according to a July 23, 1956 dispatch from the United States Embassy at Lima. It was expected earlier in the season that the canned bonito production would break all previous records, but due to a labor controversy with the fishermen during the height of the season, this prediction was not realized. On the basis of the early prospects several exporters oversold and had difficulty meeting their commitments.

SWORDFISH BASE PRICE FOR EXPORT DUTY PURPOSES: The base cost price of frozen swordfish for purposes of export tax assessment was fixed at 8,240 soles

(US\$433.68) a short ton pursuant to a Supreme Resolution of February 7, 1955, to remain in force until April 1956, when the local authorities were to revise it. Pursuant to a Ministerial Resolution of May 28, 1956, the effective date of the base price indicated has been extended to



Broadbill Swordfish (Xiphias gladius).

December 31, 1956, according to a United States Embassy dispatch July 9 from Lima. Note: See Commercial Fisheries Review, July 1956, p. 86.

Correction: In that issue the US\$ equivalent for 8,240 soles was shown as US\$33,68 when it should have been US\$433,68.

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NEW WHALING FIRM TO HUNT IN SOUTH PACIFIC: The Peruvian presscarried an article on July 6 stating that the first whaling fleet organized in Peru for the pelagic hunting of whales was expected to arrive in Talara toward the end of July.



It was reported that the fleet was coming from French and Norwegian ports and that it would be comprised of the factoryship Janina of 9,200 tons and eight Norwegian hunting boats of 258 to 300 tons each, manned by Norwegian harpooners.

According to the press, the fleet has been chartered, with an option to

purchase, by the Peruvian company to which the permanent Commission of the South Pacific has given a permit to hunt 2,400 sperm whales in the maritime zones of Chile, Ecuador, and Peru (CEP countries) between July 1, 1956, and June 30, 1957 Some of the vessels in the fleet are reported to have been transferred to the Peruvian company by their former owner. It is said that the firm that owns the vessels had initially applied for a permit to the Commission but had withdrawn its application explaining that it would charter or sell some of its vessels to the Peruvian company and in addition would guarantee the payment of the charges which companies obtaining whaling permits must remit in conformity with the regulations established by the

CEP countries. The charges have been fixed at \$5,000 for the Peruvian company, which is a reorganization of the company which was not able to implement its plans to assemble a whaling fleet in 1955.

A later dispatch, dated July 23, from the United States Embassy states that as of this date, the Peruvian Company (Mancora Maritima, S.A.) organized to exploit the permit granted by the Permanent Commission of The South Pacific (Chile, Ecuador, and Peru) is still without a whaling fleet.



Poland

STATUS OF THE FISHERIES, 1954: Poland's landings of fishery products rose from 59,300 metric tons in 1949 to 89,400 tons in 1953 and 100,000 tons in 1954. Cod

landed.

Table 1 - Pola									
Products, 1	949, 1953	3, and 19	54						
Species	1954	1953	1949						
(Metric Tons)									
Cod	49,500	47,300							
Herring	38,900								
Sprat	3,200	2,200	1,100						
Other	8,400	6,200							
Total			59,300						
Source: Polish Statis	stical Yearbo	ok 1955.							

Production of smoked fish in 1954 amounted to 11,416 tons as compared to 9,225 tons in 1953. Canned fish production rose from 4,537 tons in 1953 to 5,236 tons in 1954.

Most of Poland's fishing is done in the Baltic chiefly by small vessels. Although the fishing industry has some trawl-

ers about 150 feet long, larger vessels are being built in order to expand fishery production. From the North Sea mostly herring and some plaice are landed in Poland.



Portugal

FISHERIES TRENDS, MARCH-APRIL 1956: Sardine Fishing: The catch of the Portuguese sardine fleet amounted to only 12 metric tons in March 1956 and 423 tons in April. The April 1956 catch was 68 percent below the 1,337 tons reported for April 1955. The April 1956 sardine catch was valued at about US\$101,670 ex-vessel as compared with US\$171,583 in April 1955. The ex-vessel value of the sardine catch in April was close to 10.9 U.S. cents a pound as compared with 5.8 U.S. cents in April 1955.

During April 1956, the sardine canning industry absorbed only 44 tons with most of the balance consumed fresh. The small March sardine catch was used entirely by the fresh fish trade.

The catch of the Portuguese sardine fleet amounted to only 978 metric tons in January 1956, or about 83 percent less than the January 1955 catch. The January 1956 sardine catch was valued at about US\$191,000 ex-vessel as compared with US\$402,000 in January 1955.

The sardine canning industry in that month absorbed 739 tons with most of the balance consumed fresh or salted.

Other Fish: The landings of fish other than sardines (95 percent chinchards) for the two months totaled 889 tons, valued at US\$136,504 ex-vessel, the June 1956 Conservas de Peixe reports.

The landings of fish other than sardines (practically all chinchards) in January 1956 totaled 4,888 tons, valued at US\$208,000 ex-vessel.

* * * * *

CANNED FISH EXPORTS, JANUARY-APRIL 1956: Portuguese canned fish exports total 12,930 metric tons (680,000 cases) valued at US\$7.2 million during January-April 1956.

Portugal's exports of canned fish in March 1956 declined 18 percent in quantity and 7 percent in value when compared with March 1955. April 1956 exports dropped

Portu	guese C	Canned	Fish 1	Export	ts, Jar	uary-	April	1956		
Species	Janu	ary	Feb	ruary	Mai	rch	Ap	ril	Jan.	-Apr.
	Metric	1,000	Metric		Metric	1,000	Metric	1,000	Metric	
	Tons	US\$	Tons	US\$	Tons	US\$	Tons	US\$	Tons	US\$
Sardines in olive oil	2,317	1,158	2,889	1,524	2,692	1,424	1,867	993	9,765	5,099
Sardinelike fish in	·									
olive oil	142	127	349	288	611	538	439	368	1,541	1,324
Sardines & sardine-										
like fish in brine	99	22	249	45	155	29	50	10	553	106
Tuna & tuna like in										
olive oil	51	37	92	68	129	113	58	46	329	265
Tuna & tunalike in										
brine	4	2	28	17	51	27	13	7	96	53
Mackerel in olive										
oil	37	24	126	77	146	85	142		451	273
Other fish	25	12	_ 77	25	55	30	38		195	84
Total	2,675	1,382	3,810	2,044	3,839	2,246	2,607	1,532	12,930	7,204

52 percent in quantity and 46 percent in value as compared with April 1955, according to Conservas de Peixe, June 1956.

During January-April 1956 Germany was the leading receiver with US\$1,252,000 of canned fish (practically all sardines in oil), followed by the United States with US\$1,163,000 (principally 585 tons of sardines and 769 tons of anchovies), Italy with US\$837,000 (principally sardines and tuna), and Great Britain with US\$772,000 (principally sardines). Exports of canned fish to these 4 countries during January-April comprised 53 percent of the quantity and 56 percent of the value of the total canned fish exports.

Portugal's exports of canned fish in January 1956 declined 52 percent when compared with January 1955, but exports in February 1956 were higher by 32 percent than for February 1955, according to Conservas de Peixe, May 1956.

* * * * *

Portuguese Canned Fish Pac	k, JanFeb.	1956
Product	Net	Canner's
1 Todalos	Weight	V alue
	Metric	1,000
	Tons	US\$
Sardines in brine	-	-
Sardines in olive oil or sauce	526	318
Sardinelike fish in brine	9	3
Sardinelike fish in oil	552	553
Anchovies, rolled & fillets	-	-
Tuna in brine	-	-
Tuna in olive oil	31	33
Tunalikefish in olive oil	-	-
Other species (including shellfish)	52	17
Total	1,170	924
Note: Values converted to US\$ equiv	alent on the	basis of
28,75 escudos equal US\$1.		

CANNED FISH PACK, JANUARY-FEBRUARY 1956: The pack of canned sardines in oil or sauce for January-February 1956 amounted to 526 metric tons (net weight). The February pack was only 6 tons, and the January 1956 pack was 73 percent below the 1,912 tons packed in January 1955.



Spair

FISHERIES TRENDS, JUNE 1956: Fishing: June marked the beginning of the albacore (Germo alalunga) season

the albacore (Germo alalunga) season in the Vigo area of Spain. The Vigo albacore (known locally as "bonito") fleet was delayed by bad weather and the first boats departed around June 20. Prospects are excellent for an above-normal albacore season, according to the United States Consulate at Vigo (July 10). Catches of other fish were considerably lower than the previous year and the sardine catches seem to be definitely on the decline. The weather was poor for fishing.

Canning: The fish canning industry in the Vigo area was practically inactive during June due mainly to the lack of species appropriate for canning. It is reported that the canneries purchased only 98,000 pounds of fish during June as compared with 288,000 pounds during the previous month and 1,455,000 pounds in June 1955.

The canneries were expected to be operating at a high level in July since albacore catches are known to be good. Albacore is one of the principal products of the canneries in the Vigo area.

For the present, the canneries have an adequate supply of tin plate and olive oil. However, prices paid for olive oil are considered high. The canneries are concerned over the tin-plate situation, but it is believed in some circles that the Spanish authorities will endeavor to see that their needs are met.



Spanish Morocco

STATUS OF THE FISHERIES, 1955: Fishing continued to be an important industry in the Spanish Zone of Morocco with an estimated catch in 1955 in excess of the previous two years (see table). Only a minute portion of the estimated 10 million tons of yellowtail tuna which enter the Mediterranean each year to spawn were

Spanish Morocco (Includin	gCeuta	and M	lelilla) F	ishery	Product	ts Land	ings, 19	53-55
Item	Quantity		Value						
Item	1955 1954 1953		19	55	19	54	19	53	
	(Me	etric To	ns)	1,000	US\$	1,000	US\$	1,000	US\$
				Pesetas	1,000	Pesetas	1,000	Pesetas	1,000
Spanish Zone	12,512	10,419	10,814	36,491	1,201	25,092	826	28,592	941
Ceuta	n.a.	3,754			n.a.	15,538	511	10,973	361
Melilla	7,592	5,794	6,311	25,500	839	16,883	555	18,996	625

caught, and these mostly in the Almadraba nets on the Atlantic coast which trap the schools as they approach Morocco from the southwest.

The output of the canneries remained high, but only one plant in Larache could meet the health requirements necessary to export its product to the United States, according to a June 25 United States consular dispatch from Tangier.



MARINE OIL MARKET: Fish oil in Sweden is a comparatively minor item in the over-all fat and oil picture. There is virtually no local production of fish oil. During some seasons of the year when the herring visit the west coast of Sweden, a few are caught and some herring meal is made from the offal and surplus herring, but none of the oil is extracted separately.

Imports of fish oil into Sweden for the past three years have declined steadily.

Virtually all of the fish oil imported into Sweden is hardened after mixing with whale oil, and the mixture is used in the manufacture of table margarine. The technical director of the Margarine Cooperative of Sweden states that they use a mixture of hydrogenated whale oil and fish oil for about 20 percent of the fat content of their margarine. They buy the mixture already hardened but not refined or deodorized, preferring to do the refining and deodorization immediately preceding the

manufacture of the margarine so that the oil will be absolutely fresh. Sweden has one plant built during the last war engaged in the hydrogenation of fats and oils. Prior to that time the hardened whale oil and fish oil

was imported from Norway.

The margarine users do not bother with the proportions of whale oil and fish oil in the material which they purchase and confine their specifications to the required melting-point, which varies from 32° C. to 38° C. (89.6° F. to 100.4° F.) depending on the seasons of the year, and also to a free fatty acid content of not over 0.5 percent.

In addition to the fish oil used in the manufacture of margarine, approximate-ly 300-350 tons of liquid refined fish oil is used annually in the fish canning industry. This oil is usually purchased from Norway in the refined state and is not polymerized. Due to the unfavorable publicity given to polymerized oil, very few if any plants polymerize fish oil that is used

Sweden's Imports of Fish C of Origin, 1953-5	
Country of Origin	Metric Tons
1955:	
Norway	1,010
Denmark	232
Iceland	287
Total 1955	1,607
1954:	
Norway	1,630
Denmark	229
Iceland	268
W. Germany	270
Total 1954	2,438
1953:	
Norway	1,457
Denmark	154
Iceland	100
Total 1953	1,829

for edible purposes. The margarine manufacturers use fish-liver oil in their margarine for the vitamin content and they usually purchase the better grades of cod-liver oil, standardizing this material for vitamin A and C content themselves. They buy the codliver oil directly from the fishing fleet which is engaged in the trade of fishing for cod.

So far as we were able to find out, no menhaden oil is imported into Sweden from the United States. However, in Hamburg one firm has shipped some American menhaden oil from Rotterdam under the name of herring oil. The particular lot of oil that was shipped originated in the Gulf, and had a lower iodine number than the oil from the Atlantic coast.

Exports of fish oil from Sweden are negligible and probably consist only of codliver oil. The maximum was 21 tons, which was exported to Norway in 1955. It is practically impossible to secure any reliable statistics for fish oil alone. In all cases they are combined, for official purposes, with whale oil, etc.

This is one of eight reports on a survey undertaken by the U.S. Fish and Wildlife Service of markets for United States-produced fish oils with emphasis on Western Europe.

Note: See Commercial Fisheries Review, August 1956, p. 47; also see pp. 58, 66, 70, 71, 87, 90, & 99 of this issue,



Union of South Africa

FISHERIES TRENDS, MAY-JUNE 1956: Fishing in Union of South Africa waters in May and June this year has been disappointing and production of canned fish and fish meal consequently has been low. Overseas quotations for fish meal continue to decline while prices for fish oil remain firm. The demand for canned fish in the export market is said to have increased considerably with improvement in export prices. Canned and frozen rock lobster production in the Union has been satisfactory and stocks have been liquidated against firm overseas demand at profitable prices.

Reliable sources here report the discovery of breeding grounds just north of Walvis Bay of pilchards caught off the South-West African coast. These breeding grounds are said to cover an area of 800 square miles.

This discovery apparently was made by South African scientists aboard the 90-ton research vessel $\underline{\text{Namib}}$ $\underline{\text{II}}$, a floating laboratory for the Department of Fisheries of South-West Africa. The captain of this vessel states that over a period of time he has collected spawn in silk plankton nets in this area, confirming the existence of pilchard breeding grounds, according to the United States Consulate at Cape Town (report dated July 11).

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SALDANHA BAY FISHERIES AT A LOW LEVEL: According to newspaper reports, the canning industry and the fishermen operating within a radius of 60-70 miles from Saldanha Bay Harbor in the Union of South Africa are experiencing the worst season in 20 years. The present scarcity of fish is comparable to that of 1933 which was considered to be the worst in the history of the industry, states a June 25 dispatch from the United States Consul at Cape Town.

The hardest hit are the hundreds of independent fishermen who operate from Saldanha. The newspaper reports: "as soon as there is a rumor that the fish are running the boats put out to sea in hopes of a profitable catch, but they return with hardly enough to meet fuel and running expenses. With hardly any money coming in because of the lack of fish, the independent fishermen are described by one cannery official 'just living on the breadline'."

Sporadic schools have yielded more than 300 tons in a recent two-day period, but this is considered poor compared with catches in previous years which have exceeded this amount fivefold.

The scarcity of fish has also caused financial losses to the canning industry in the area.

* * * * *

FISH PUBLICITY CAMPAIGN LAUNCHED: Following the report of the Special Committee on Fish consumption, an advertising agency is to take the lead in a nation-wide publicity campaign to make South Africa more fish-minded.

The campaign was scheduled to begin early in July with large advertising spaces in the national press, bringing to the public the "Eat More Fish" message and pointing out the nutritional and economic benefits of fish as a major item in the daily diet. In addition, radio programs will be used.

An important part of this campaign will be directed towards the African and other non-European people through their own press. Hotels, cafes, clubs, and institutions will be persuaded to feature fish prominently on their menus.

The advertising campaign will be closely supported by many other forms of fish publicity, including intensive editorial publicity handled by a Cape Town firm of public relations consultants. The editorial publicity campaign has already been foreshadowed by a regular series of fish recipe articles in English and Afrikaans, which are now being published by newspapers and magazines all over the Union and in the Federation of Rhodesia and Nyasaland.

Several daily newspapers have agreed to run competitions for the best fish recipes sent in by readers, which will intensify the interest in fish cooking and bring the "Eat More Fish" message right into the home. Prizes for these competitions, which are to be run individually by the newspapers, are being put up by the advertising agency.

The Union's Department of Nutrition is cooperating closely with the advertising and public relations side of the campaign, and the cooperation of the Director of the Fishing Industry Research Institute, Cape Town, has already been enlisted for writing signed articles and broadcasts on the nutritional value of fish.

A valuable weapon in this campaign to make South Africans more fish-conscious will be the Deep Sea Fisheries Information and Publicity Centre, opened this month. Here it is planned to hold demonstrations of fish cooking, lectures, and film shows for women's organizations, domestic science teachers, and others.

Available at the Centre will be information on the trawling industry for schools, students, and journalists, and it will be open for inquiries on all aspects of fish cookery and fish preparation.

The Centre is in a spacious room equipped with a kitchen, and has been designed and furnished with the maximum of comfort by a Cape Town artist. From a model "Frikkie Bar" refreshments and fish snacks will be served at gatherings. A model shop window has been built into the room over which a cinema screen can be drawn for film shows. A wall newspaper is being organized so that visitors can be kept up to date with the latest developments in the campaign.

The trawling industry will in the future be represented at shows and exhibitions all over the country. Frikkie Fish Bars will be organized at charity and other shows.

A second book in the painting and story book series about the adventures of Frikkie and Seabell, the mermaid, is now in the press and will soon be available to the trade and the public. The second edition of the first book is now almost sold out. More than 75,000 copies have been distributed.

A comprehensive film in color on all aspects of the trawling industry is now being made and will later in the year be available for schools, institutions, clubs, and other organizations.



United Kingdom

MARINE OIL MARKET: Marine oils receive the greatest interest in the United Kingdom from the edible oil trade. No matter what the source of oil is (for edible purposes) it is used in the hydrogenated form. The principle marine oil used is whale oil. In addition to this, herring oil of local production is also used. The duty on herring oil into the United Kingdom is 10 percent ad valorem, and this practically precludes the importation of any fish oil. There is no duty on whale oil.

Whale Oil: The United Kingdom uses more whale oil than is produced by the whaling fleet operating under the British flag. Informal trade estimates of the total quantity of whale oil that will be available totals approximately 50,000 to 54,000 metric tons. In view of present rapid movements of prices and sudden changes in availability of other oils and fats, it is difficult to set out detailed figures. From the views expressed by a number of the leading buyers, however, the opinion exists that potential demand is greater than supply so that, provided sellers do not ask for prices out of line with those of other materials, the quantity of oil indicated should all move into consumers' hands easily and possibly quickly. Although it is not used for precisely the same purpose, whale oil to a very large degree determines the markets for fish oils generally. The same is not true of whale-meat meal, although prices of whale-meat meal do, in fact, move conformitively with those of fish meals.

Herring Oil: The herring oil and meal industry is operated by the Herring Industry Board which is a quasi-Government agency. This Board operates two reduction plants in Scotland; one at Aberdeen, and the other at Frazerbrook, which is 80 miles north of Aberdeen. The production of herring oil has varied somewhat in



the last four or five years and definitely is not growing. All of the oil is sold to two companies in about equal proportions. Sales are made in advance of production and are subject to the oil being produced. If there is no production, then there will be no sales contract effective. The two principal companies who share the production of herring oil refine and hydrogenate herring oil, but it is not believed that in either case the oil is polymerized prior to hydrogenation. One of the companies is using the hydrogenated herring oil in the manufacture of their lowergrade margarine. The other firm is using the hydrogenated herring oil in the production of a lower grade of cooking fat or shortening which is distributed in the United Kingdom. Both companies are quite secretive regarding the use of this product and claim that it is only a minor portion of the total oils used for edible purposes.

Prices have been higher this year than last year for herring oil and the reason given is that whale oil as well as liquid vegetable oils have advanced in price, thus making the value of all fats and oils used

for edible purposes advance somewhat, although not in the same proportion or amount as have soybean oil, cotton seed oil, peanut oil, etc.

Pilchard Oil: There is imported into the United Kingdom between 10,000 and 15,000 tons of treated South African pilchard oil. This oil is of a high iodine value, made by the "Solexol" proc

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British Herring Industry Production of Herring Oil and Meal, 1951-55						
Year		Oil	Meal			
		(Metri	c Tons)			
1955		6,939	12,236			
1954		7,000	14,000			
1953		8,633	18,042			
1952		5,518	11,532			
1951		1,958	3,982			

ess. There is no duty on this oil, since it is used strictly for industrial purposes. Most of it is used as a drying-oil extender in the paint business, but some is also used in making cheaper grades of floor coverings. This oil must sell for at least 10 percent less than linseed oil in order for it to be attractive to the drying-oil users.

This is one of eight reports on a survey undertaken by the U. S. Fish and Wildlife Service of the markets for United States-produced fish oils with emphasis on Western Europe.

Note: See Commercial Fisheries Review, August 1956, p. 47; also see pp. 58, 66, 70, 71, 87, 90, & 96 of this issue.

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IMPORT QUOTA FOR CANNED SALMON FROM NORTH AMERICA AND SO-VIET RUSSIA: British import quotas for canned salmon from North America for the year ending June 30, 1957, are the same as for the preceding year, but there was a reduction of US\$616,000 in the import quota from Soviet Russia, the British Board of Trade reported in a release dated July 17, 1956.

The notice to importers No. 788, July 18, 1956, is as follows:

"Notices to Importers Nos. 739, 744, dated July 9, 1955 and August 6, 1955 respectively, announced arrangements for the import of canned salmon from North America and the Union of Soviet Socialist Republics during the year ending June 30, 1956. The Board of Trade now announce that further quotas have been arranged for the import of canned salmon originating in and consigned from those sources during the year ending June 30, 1957.

"The quotas are as follows:

"From North America L3 million (US\$8,400,000) f.o.b. (L3.3 million-US\$9,240,000-c.i.f.)

"From U.S.S.R. ± 1 million (US\$2,800,000) f.o.b. (£1.1 million-US\$3,080,000-c.i.f.)

"The British Board of Trade also stated that imports from Japan would be expected to continue in 1956/57 and a further quota for Japan will be fixed in the fall. The imports of canned salmon from Japan in 1955/56 were valued at US\$13,160,000 (United States Embassy in London, dispatch dated July 19).

* * * * *

CAMPAIGN TO SELL MORE FISH TO THE HOUSEWIFE: There has already been a good response from retailers to the new British advertising campaign launched by the White Fish Authority (W.F.A.) early in June, points out The Fishing News (June 15), a British fishery periodical.

The campaign, on which the W.F.A. is to spend US\$280,000 in 1956-57, aims at focusing the housewife's attention on the men who serve her at the fishmonger and in the fried fish shop. This approach dovetails with the direct advertising of fish sponsored by other interests in the industry.

Apart from national advertising which puts into the mouth of "Our Fishmonger" or "The Man in our Fried Fish Shop" words pointing to one or another particular value of fish, there are ideas and blocks for local newspaper advertising in which retailers can insert their own names.

The "Whispering Fish" promotion scheme continues and includes leaflets and fish recipes.

The W.F.A. is planning to back up their advertising campaign with an advisory scheme for the fishmongers and friers to help them to sell more fish when the advertisements have drawn the housewife to their shops.

Although the campaign is concentrated at the retail stage, its benefits will be reflected in all sections of the industry as it helps to increase the housewife's demand for fish.

* * * * *

CODE OF PRACTICE FOR FREEZING FISH: A Code of Practice for freezing fish was issued by the British White Fish Authority on June 1956. The new code supersedes one issued in July 1953 and provides:

- Quick frozen fish in relation to white fish means fish which has been
 - (a) frozen by process which reduces the temperature of the whole of the fish from 32° F. to 23° F. or lower in not more than two hours; and
 - (b) kept in the freezer until the temperature has been reduced to minus 5° F, or lower.
- Fish which has not been so frozen should not be described or offered for sale as "Quick Frozen."
- Fish for quick freezing should be of such quality as could reasonably be expected after storage and transport to provide good, wholesome food when thawed.
- Fish should be adequately iced whilst awaiting processing and should be frozen with the minimum delay.
- 5. An officer authorized by the Authority shall at any reasonable time be given facilities at the quayside or at the premises of the processor for the examination of all fish intended for quick freezing, in order that he may ascertain whether its quality and the conditions under which it is handled, processed, frozen and stored are satisfactory and conform in all respects to this Code.
- 6. The wrapper or container of quick frozen fish packed for sale either by wholesale or retail should either enclose a slip of paper carrying a code mark, or itself be marked with a code mark. If fish is quick frozen without a wrapper, a slip of paper carrying the code mark should accompany the fish. The code mark should enable the processor to be identified, and his records of code marks should be such as to enable him to detail particulars of purchase, freezing and storage.
- 7. The weight of consumer packs is subject to legislation. For all other packages, the net weight at the time of packing before freezing should not be less than the weight at which the package is purported to be sold.
- 8. Immediately after freezing, all quick-frozen fish should be placed in cold storage at a tem-

- perature not higher than minus $5^{\rm O}\,F$., or at a lower temperature where possible. A pipecooled store should be preferred.
- A steady temperature should be maintained in the cold store; the following points should be observed:
 - (a) All cold stores should be fitted with an air-lock.
 - (b) The quick-frozen fish should be as near as possible to the temperature of the cold store at the time of storage.
 - (c) Quick frozen fish should be kept from direct contact with the floor, walls, ceilings, and cooling pipes of the store by the use of racks, battens, and similar devices.
 - (d) Where quick frozen fish is passed into a cold store by conveyor belts, the opening for the belt should be as near the roof of the store as practicable.
 - (e) The opening of doors should be reduced to a minimum and they should not be left open.
 - (f) Freezing and storing should not be carried out in the same chamber at the same time.
 - (g) Where the store is controlled thermostatically, the controlling mechanism should be adjusted so that there is only a narrow variation between stopping and starting temperatures.
- All quick frozen fish should be tightly wrapped in a water-vapour proof material or should be glazed. Double glazing is desirable.
- Quick frozen fish which has been glazed should, if kept in cold storage for several months, be regularly examined and re-glazed when necessary.
- All quick frozen fish stored should be regularly examined to ensure that it has been satisfactorily preserved during cold storage.
- All consumer packs and any type of quick frozen fish intended for subsequent storage should be transported in pre-cooled insulated containers.

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SCOTTISH HERRING FISHERIES PROSPECTS FORECAST ANNUALLY: Prospects are good for Scottish herring fisheries in the North Sea during this year, and a good stock of herring is expected both on the Shetland grounds and off the northeast coast of Scotland. This is the encouraging prediction made by the Marine Laboratory at Torry, Aberdeen, Scotland in its annual forecast for the fisheries, published in the current issue of the "Scottish Fisheries Bulletin."

The forecast is compiled from extensive data on the distribution, abundance, movements, and availability of herring stocks in the fishing areas,

In a review of the forecast for 1955, the Bulletin says that the results of the fisheries that year were in general agreement with the forecast, and in all of them the average landings were maintained at a high level.

It is revealed that in the Northeast Coast fishery the catches of the two-yearold age group in 1954 and 1955 were larger than in any other year on record, and the young herring have increased in size.

In making their forecast for this year the Torry scientists point out that general biological events in recent years have caused striking changes in the abundance and composition of the fishable stocks and in the productivity of the fisheries.

"Reservation must also be made for the possible effects of other factors which may have a marked influence on the resources of the fisheries—weather conditions during the fishing season; size and searching power of the fishing fleets. The predictions are made on the assumption that the searching power of the fleets and the general conditions (weather, etc.) affecting their operation are generally favorable."

The forecast also includes details by fishing area and prospects for the early and later herring fishing which takes place in some areas, according to a report which appeared in the July 13 issue of the British periodical The Fishing News.



FISHERY PRODUCTS--GREAT PROFIT POTENTIAL FOR RETAILERS

One of the greatest profit potentials for the food retailer yet to be exploited is fishery products, Frank W. Wilkisson, New York, N. Y., stated on April 18, 1956, upon assuming the presidency of the National Fisheries Institute, national trade association of the fishing industry, which held its Eleventh Annual Convention at Miami Beach, Fla.

Wilkisson stated that food retailers can use fishery products, with all their varieties and glamorous appeal, as a traffic builder for their stores.

"The retailer can make big money on fisheries products," said Wilkisson. "In fact, I don't know of a single food retailer who has not made increased profits when he has given space and attention to fish products. All he hast odo is to use fish and seafoods as a leader to create store traffic; give space enough to such products to permit good display and promote to the consumer the fact that he has such attractive foods.

"The retail trade has hardly begun to exploit fish products for profits as it can and should," continued Wilkisson. "They are one of the few as yet not fully-exploited lines of products on the retailer's shelves and in his freezers. This is true of fresh fish and seafoods the same as frozen. The next few years will see great strides in this field and the retailer who capitalizes on our products now is certain to build customers for his whole retail outlet."

"An indication of the high-profit rating of fish products is shown by a study by <u>Progressive Grocer</u> of selected supermarkets in Cleveland. Profits of meat products over a 13-week period averaged 16.9 percent; dairy products, 15.5 percent; and all frozen food products, 22.2 percent. On the other hand, margins on cooked frozen seafoods ran to 42.4 percent and uncooked, 29 percent, showing that profit margins on fish products run considerably higher than other foods."

--Excerpt from address at National Fisheries Institute Eleventh Annual Convention, April 18, 1956.



Federal Trade Commission

WEST COAST TUNA INDUSTRY CHARGED WITH PRICE FIXING:

The Federal Trade Commission on September 12, 1956 (Docket No. 6623, Tuna) charged that virtually all of the tuna industry on the West Coast is engaged in a conspiracy to fix tuna prices and to prevent competition in this industry.

The West Coast accounts for more than 90 percent of the Nation's tuna pack, which has an annual wholesale value of \$200 million. Cited are an assocation of canners and its membership; three area unions, affiliates of either the A.F. of L. or the International Longshoremen & Warehousemen's Union; and several associations of tuna boat owners.

Charging violation of Sec. 5 of the FTC Act, the complaint alleges that the boat owners' associations each year in an unauthorized manner negotiate with the canners to fix the prices paid to their members for raw tuna. The Unions, the complaint continues, then enter into working agreements with the boat owners on the basis of the illegally-fixed prices, with the Unions retaining the right to approve or disapprove such prices. The complaint charges that the respondents use their power and influence to see that these prices are maintained.

The canners are separately charged with conspiring among themselves to maintain fixed prices which they charge for canned and frozen tuna and to suppress competition among themselves and with others. Some of the canners and boat owners are charged further with conspiring to prevent competition from the Japanese tuna industry.

The result of these activities, the complaint charges, is to hinder catch-

ing tuna in Pacific waters and in Japan and to restrain competition in the purchase of raw, canned, and frozen tuna. The ultimate result of the conspiracies, the complaint states, is that the public must pay more for tuna.

According to the complaint, the boat owner associations ostensibly were organized as cooperative marketing associations but, in effect, serve principally to fix noncompetitive prices.

The dominant association of boat owners is charged with committing coercive acts to maintain these prices. For example, vessels are not permitted to fish for any canner who does not agree to pay the fixed prices. In other instances, vessel owners are not allowed to fish until they agree to sell a canner designated by the association.

Members of the Unions, according to the complaint, refuse to fish for tuna until they have approved the agreed prices. Some do not fish on any boat whose owner has not agreed to abide by the fixed prices.

The Unions also are charged with operating patrol boats, in cooperation with some of the boat owners, to police the San Pedro and San Diego tuna fishing areas to assure that the agreed prices are adhered to as well as union rules and regulations. The patrol boats also prevent boat owners and fishermen who do not belong to an association or a union from selling their fish unless they agree to the prices. All must pay an assessment for maintenance of the patrol, the complaint adds.

All parties are charged with attempting to limit the length of time in a season during which tuna may be caught.

The complaint then lists these charges: Since about 1952 the canners, particular-

ly the three largest canners, who jointly account for 70 percent of the tuna pack, have conspired jointly with the dominant association of boat owners to restrict free competition at their level of the industry. For example, they have agreed, to some extent, on fixed prices, discounts, and terms of sale of canned and frozen tuna. They also have acted to require all to adopt uniform cost-accounting systems. They have exchanged weekly confidential reports showing their individual purchases, sales, and inventories. They have acted to prevent canners from selling on a consignment basis and to assure that no member canner acquires excessive stocks of canned tuna. The canners, the members of the association, and the San Diego Union are charged with suppressing competition from the Japanese tuna industry.

According to the complaint, these respondents have: (1) curtailed the volume of Japanese canned tuna exported to the United States and raised the prices of this commodity; (2) controlled the volume of Japanese imports of fresh frozen tuna and raised the prices of this commodity; (3) suppressed exports of Japanese tuna discs; and (4) sent a Tuna Plan Committee to Japan for the purpose of effectuating their conspiracy.

The complaint notes that among the tuna exported by Japan to the United States are frozen precooked can-shaped pieces of tuna known as "tuna discs." The American importer adds liquid to this commodity, lids the can, and completes the cooking process. Most of the importers engaged in this business are East Coast competitors of these respondents. The complaint charges that the respondents have attempted to cut off the source of supply to these competing canners.

Finally, two of the largest canners are charged with controlling the summer markets for fresh and frozen albacore tuna in both California and Japan by raising and then depressing the prices of albacore tuna in these areas.

The business of canning tuna is conducted principally in California and supports over 100,000 people on the West Coast alone. There are various species

of tuna: albacore, yellowfin, skipjack, bluefin, bonito, and yellowtail.

There are three types of fishing vessels used in fishing for tuna. The principal fleet is comprised of tuna clippers, large boats capable of extended voyages and equipped for prompt freezing of tuna. The clipper fleet, which is stationed in San Diego, accounts for approximately 70 percent of all the tuna caught in the United States. An association represents the great majority of this fleet.

The second most important fleet is comprised of purse seiners, smaller vessels fishing off the Pacific Coast. This fleet operates principally out of San Pedro, and its catch accounts for about 17 percent of the total. This fleet is also represented by an association.

The third fleet is comprised of approximately 3,500 small vessels referred to as "albacore boats." This fleet accounts for about 13 percent of the total tuna catch. It also is represented by an association.

The boats deliver the tuna directly to the canners who clean, cook, and fillet them into varying grades of tuna. The bulk of the total pack is canned in 7-ounce and $6\frac{1}{2}$ -ounce cans and shipped in cases of 48 cans each. The grades of tuna are: fancy, standard, grated or shredded, and tuna flakes.



A tuna clipper unloading at San Diego. Water in trough carries fish to weighing shed and then to bins outside cannery.

According to the complaint, the dominant association has been entering into written price-fixing agreements with the canners

since January of 1953. Negotiations are carried on for several months, and when the princes are finally agreed upon, they become the established prices for the entire tuna industry on the Pacificic Coast.

During these negotiations the dominant association of boat owners keeps in contact with the San Diego Union, which has the right, by member vote, to accept or reject the prices. Since 1952 the Union has accepted the prices, but it is tacitly understood, the complaint says, that if the prices are not acceptable, the union members will refuse to fish for tuna until there is an adjustment.

(It is common in the industry for union members to be paid for fishing on a share basis with the boat owners rather than by a fixed salary or wage.)

The parties are granted 30 days in which to file answer to the complaint. A hearing was scheduled November 19 in Long Beach, Calif., before an FTC hearing examiner.



Department of Health, Education, and Welfare

FOOD AND DRUG ADMINISTRATION:

CANNED TUNA IDENTITY AND FILL-OF-CONTAINER STANDARD PROPOSED:

A proposed standard for identity and fill-of-container for canned tuna was announced by the Food and Drug Administration. Full text of the standard, which was proposed in a petition filed by the National Canners Association and 21 tuna packers, was published in the Federal Register of August 28.

The standard would designate the various species of fish which may be called tuna. In addition to the true tunas, custom has long sanctioned use of the term "tuna" as applied to canned skipjack. The standard recognizes this practice, and adds to the list of tunas "kawakawa" or bonito, Euthynnus yaito, a species taken in the Pacific and canned in the Hawaiian Islands.

The standard would define the styles of pack and require uniform names for these, namely "Solid" or "Solid Pack," "Chunks" or "Chunk Style," "Flakes," and "Grated." These names are now in general use.

The standard would require an accurate labeling statement as to the color of the tuna. Light-colored tuna is generally considered more desirable and there has been some consumer complaint in the past because rather dark tuna was



Test canning little tuna at a U. S. Fish and Wildlife Service Technological Laboratory. Removing pack from retort after processing,

labeled as "Light." The standard provides for differentiating between the shades of color by use of a special optical instrument so that there need be no reliance on opinion as to the color. Under the standard tuna would be labeled as "White," "Light," "Dark," "Blended Light and Dark," or "Blended Dark and Light."

The name of the packing medium would be required to be shown on the label. The permitted liquids are vegetable oils, olive oil, and water. The standard would also permit optional use of seasoning ingredients with appropriate label declaration.

A proposed standard of fill would require cans of tuna to be filled as full of fish as has been found practicable. Compliance with this requirement would be determined by removing the contents of a can, pressing out the oil and watery juice, and weighing the press cake consisting of cooked fish of relatively uniform composition.

Thirty days is allowed for filing written comments on the proposed standard.

In the event the standard is adopted. it would be the first mandatory Federal standard for canned tuna. If adopted, can-

DEPARTMENT OF HEALTH, EDU-CATION, AND WELFARE

Food and Drug Administration

[21 CFR Part 37]

CANNED TUNA FISH

NOTICE OF PROPOSALS TO ADOPT DEFINITION AND STANDARD OF IDENTITY AND STANDARD OF FILL OF CONTAINER

Notice is hereby given that a petition has been filed by National Canners Association, 1133 Twentieth Street NW., Washington, D. C., and the following canners of tuna fish: Barbey Packing Corporation, F. E. Booth Company, Inc., California Marine Curing and Packing Company, Columbia River Packers Association, Inc., Crown Packers, Inc., Far-west Fishermen, Inc., Franco-Italian Packing Company, Inc., Hawaiian Tuna Packers Ltd., High Seas Tuna Packing Company, Inc., Pan-Pacific Fisheries, Inc., Point Adams Packing Company, Portland Fish Company, Seattle Sea-foods, Inc., South Coast Fisheries, Inc., Star-Kist Foods, Inc., Union Fishermen's Co-Operative Packing Company, Van Camp Sea Food Company, Inc., Washing-ton Packing Corporation, West Coast Fish Company, Inc., Westgate-California Tuna Packing Company, Whiz Fish Products Company.

The petition sets forth proposals to adopt a definition and standard of identity and a standard of fill of container for canned tuna. The proposals are set

forth below.

Notice is also given that supplementary petitions have been filed by Hawaiian Tuna Packers Limited, 215 Market Street, San Francisco 8, California, and by the California Fish Canners Association, Inc., Ferry Building, Terminal Island, California, each proposing certain additional provisions to be added to the definition and standard of identity for canned tuna proposed by the National Canners Association. The proposals contained in these supplementary petitions are also set forth below.

Pursuant to the authority of the Federal Food, Drug, and Cosmetic Act (sec. 401, 701, 52 Stat. 1046; Pub. Law 905, 84 Cong., 2d Sess.: 21 U. S. C. 341, 371) and delegated to him by the Secretary of Health, Education, and Welfare (20 F. R. 1996), the Commissioner of Food and Drugs invites all interested persons to present their views in writing regarding the proposals published below. Such views and comments should be submitted in quintuplicate, addressed to the Hearing Clerk, Department of Health, Education and Welfare, Room 5440, 330 Independence Avenue SW., Washington 25, D. C., prior to the thirtieth day following the date of publication of this notice in the FEDERAL REGISTER:

1. The definition and standard of identity and the standard of fill of container proposed for canned tuna by the National Canners Association are as

follows:

§ 37.1 Canned tuna: definition and standard of identity; label statement of optional ingredients. (a) Canned tuna is the food consisting of processed fish of the species enumerated in paragraph (b) of this section, prepared in one of the optional forms of pack specified in paragraph (c) of this section, conforming to one of the color designations specified in paragraph (d) of this section, in one of the optional packing media specified in paragraph (e) of this section, and may contain one or more of the seasonings and flavorings specified in paragraph (f) of this section. It is packed in hermetically sealed containers and so processed by heat as to prevent spoilage. It is labeled in accordance with the provisions of paragraph (h) of this section.

(b) The fish included in the class

known as tuna fish are:

Thunnus thynnus Bluefin tuna. Thunnus maccoyii _____ Southern bluefin tuna.1 Thunnus orientalis ____ Oriental tuna.2 Thunnus germo_____ Albacore.³
Parathunnus mebachi_ Big-eyed tuna.³
Neothunnus macropte- Yellowfin tuna.³

Neothunnus rarus_____ Northern bluefin.2

1"A Comparison of the Bluefin Tunas, Genus-Thunnus, from New England, Australia, and California," by H. C. Godsli and Edwin K. Holmberg, State of California, Department of Natural Resources, Division of Fish and Game, Bureau of Marine Fisheries. Fish Bulletin No. 77 (1950).

2 "Contributions to the Comparative Study of the So-called Scombroid Fishes," by Kam-akichi Kishinouye, Journal of the College of Agriculture, Imperial University of Tokyo, Vol. VIII, No. 3 (1923).

3 "A Systematic Study of the Pacific Tunas," by H. C. Godsil and Robert D. Byers, State of California, Department of Natural Resources, Division of Fish and Game, Bureau of Marine Fisheries Fish Bulletin No. 60 (1944)

"A Descriptive Study of Certain Tuna-Like Fishes," by H. C. Godsil, State of California, Department of Fish and Game, Fish Bulletin

The description of each species will be found in the text to which reference is made.

(c) The optional forms of processed tuna consist of loins and other striated muscular tissue of the fish. The loin is the longitudinal quarter of the great lateral muscle freed, in accordance with good commercial practice, from skin, scales, visible blood clots, bones, gills, viscera, and black meat. Black meat is the nonstriated part of the great lateral muscle of tuna, known anatomically as the median superficial muscle, highly vascular in structure, dark in color because of retained blood, and granular in form. Canned tuna is prepared in one of the following forms of pack, the identity of which is determined in accord-ance with the methods prescribed in paragraph (b) of § 37.2.

ned tuna not meeting any standard adopted would be banned from shipment in interstate commerce.

The full text of the proposed standard as published in the Federal Register follows:

> (1) Solid or solid pack consists of loins cut in transverse segments to which no free fragments are added. In containers of 1 pound or less of net contents, such segments are cut in lengths suitable for packing in one layer. In containers of more than 1 pound net contents, such segments may be cut in lengths suitable for packing in one or more layers of equal thickness. A piece of a segment may be added if necessary to fill a container. The proportion of free flakes broken from loins in the canning operation shall not exceed 18 percent.

(2) Chunks or chunk style consists of a mixture of pieces of tuna in which the original muscle structure is retained. The pieces may vary in size, but not less than 50 percent of the weight of the pressed contents of a container is retained on ½-inch-mesh screen. (3) Flakes consist of a mixture of

pieces of tuna in which more than 50 percent of the weight of the pressed contents of the container will pass through a 1/2-inch-mesh screen, but in which the muscular structure of the fish is retained.

(4) Grated consists of a mixture of particles of tuna that have been reduced to uniform size and in which more than 50 percent of the pressed weight of the contents of the container will pass through a 1/2-inch-mesh screen, and in which the particles are discrete and do not comprise a paste.

(d) Canned tuna, in any of the forms of pack specified in paragraph (c) of this section, falls within one of the following color designations, measured by visual comparison with matte surface neutral reflectance standard corresponding to the specified Munsell units of value, determined in accordance with paragraph (g) of this section:

(1) White tuna. This color designation is limited to the species of tuna Thunnus germo (albacore), and is not darker than Munsell value 6.3.

(2) Light tuna. This color designation includes any tuna not darker than Munsell value 5.3.

(3) Dark tuna. This color designation includes all tuna darker than Munsell value 5.3.

(4) Blended tuna. This color designation may be applied only to tuna flakes specified in paragraph (c) (3) of this section, which consist of a mixture of tuna flakes a substantial portion of which meet the color standard for either white tuna or light tuna, and the remainder of which fall within the color standard for dark tuna. The color designation for blended tuna is determined in accordance with paragraph (g) of this section.

(e) Canned tuna is packed in one of the following optional packing media:

(1) Any edible vegetable oil other than olive oil, or any mixture of such oils not containing olive oil.

(2) Olive oil.

(3) Water.

(f) Canned tuna may be seasoned or flavored with one or more of the following:

- (1) Salt
- (2) Purified monosodium glutamate.
- (3) Hydrolyzed protein.
- (4) Hydrolyzed protein with reduced
- monosodium glutamate content. (5) Spices or spice oils or spice ex-
- tracts (6) Vegetable broth or sauce, in an amount not in excess of 5 percent of the volume capacity of the container, such broth or sauce to consist of a minimum of 0.5 percent by weight of vegetable extractives and to be prepared from two or more of the following vegetables: Beans, cabbage, carrots, celery, garlic, onions, parsley, peas, potatoes, red bell peppers and green bell peppers, spinach, and tomatoes
- (g) For determination of the color designations specified in paragraph (d) of this section, the following method shall be used: Recombine the separations of presscake resulting from the method prescribed in § 37.2 (b). Pass the combined portions through a circular sieve 12 inches in diameter, fitted with wovenwire cloth of 1/4-inch mesh which complies with the specifications for such wire cloth set forth in "Standard Specifica-tions for Sieves." published March 1. 1940, in L. C. 584 of the U. S. Department of Commerce, National Bureau of Standards. Mix the sieved material by hand, and place a sufficient quantity into a 307 x 113 size container (bearing a top seam and having a false bottom approximately 1/2-inch deep and painted flat black inside and outside) so that after tamping and smoothing the surface of the sample, the material will be 1/8-inch to 1/4-inch below the top of the container.

(1) Determine the Munsell color value of the sample surface by visual comparison, using a comparator eveniece containing a color filter centering between 550 mu and 560 mu, which filter does not pass significant amounts of visible radiation of wavelengths below 540 mu or

above 570 mu.

- (2) The standards with which comparisons are to be made are any essentially neutral matte finish standards of luminous reflectance equivalent to 6.3 and 5.3 Munsell units of value. These standards shall be cut in circles 31/4 inches in diameter and shall be mounted in 307 x 113 size containers, bearing a top seam and painted flat black both inside and outside, so that the surfaces of the standard are $\%_{16}$ -inch below the top of the containers in which they are mounted,
- (3) In the case of blended tuna, the foregoing method shall be varied by first separating, as completely as feasible, the two different colors of tuna flakes, and then proceeding with each portion separately for the determination of its color value.
- (h) (1) The specified names of the canned tuna for which definitions and standards of identity are prescribed by this section, except where water is the packing medium, are formed by combining the form of the pack with the color designation of the tuna; for example, "Solid Pack White Tuna," "Grated Dark Tuna," etc. In the case of blended tuna, there shall be used the applicable color designation of the blended flakes determined, in accordance with the color designation of the predominating portion found in the container; for example, "Blended White and Dark Tuna Flakes." "Blended Dark and Light Tuna Flakes."

- tuna when water is used as the packing medium is formed as described in subparagraph (1) of this paragraph, followed by the words "In water" for example, "Grated Light Tuna in Water."
- (3) When the packing medium is vegetable oil or olive oil, the label shall bear the name of the optional packing medium used, as specified in paragraph (e) of this section, preceded by the word "in" or the words "packed in." In the case of the optional ingredient specified in paragraph (e) (1) of this section, the name or names of the oil used may be stated, of the general term "Vegetable Oil" may be used.
- (4) In case solid pack white, light, or dark tuna is packed in olive oil, the designation "Tonno" may also appear.
- (5) Where the canned tuna contains one of the ingredients listed in paragraph (f) of this section, the label shall bear the statement "Seasoned with ___," the blank being filled in with the name or names of the ingredient or ingredients used, except that if the ingredient designated in paragraph (f) (6) of this section is used, the label shall bear the statement "Seasoned with Vegetable Broth" or "Seasoned with Vegetable Sauce," and if the ingredient designated in paragraph (f) (5) of this section is used alone, the label may bear the statement "Spiced" or "With Added
- (6) Wherever the name of the food appears on the label so conspicuously as to be easily seen under customary conditions of purchase, the names of the optional ingredients used as specified by subparagraphs (3) and (5) of this paragraph shall immediately and conspicuously precede or follow such name without intervening written, printed, or graphic matter, except that the common name of the species of tuna fish used may be so intervened, but the species name "albacore" may be employed only for fish of that species which meets the color designation prescribed by paragraph (d) (1) of this section.
- § 37.2 Canned tuna; fill of container, label statement of substandard fill. (a) (1) The standard of fill of container for canned tuna is a fill such that the average weight of the pressed cake from 24 cans, as determined by the method prescribed by paragraph (b) of this section, is not less than the minimum value specified for the corresponding can size and form of tuna ingredient in the following table:

I. Can size and

603 x 408:

II. Minimum value for

weights of pres

37.9

form of tuna cake (average of 24 ingredient cans) 211 x 109: Ounces Solid Chunks Flakes Grated _____ 2.00 Solid _____ 4.47
 Chunks
 3.92

 Flakes
 3.92

 Grated
 3.96
 401 x 206: Solid -Sond Chunks
Flakes
Grated . 68 7 69

Solid ______Chunks

Flakes _____ 37.9

- (2) The specified name of the canned | If the can size in question is not listed, calculate the value for column II as follows: From the list select as the comparable can size that one which has nearest the water capacity of the can size in question and multiply the value listed in column II for the same form of tuna ingredient by the water capacity of the can size in question and divide by the water capacity of the comparable can size Water capacities are determined by the general method provided in § 10.2 (a) of this chapter.
 - (b) The methods referred to in paragraph (a) of this section for determining the weight of the pressed cake and referred to in § 37.1 (c) for determining the percent of free flakes and the percent of pieces which pass through a 1/2-inchmesh sieve are as follows:

(1) Have each of the 24 cans and contents at a temperature between 65° F. and 80° F. Test each can in turn as follows:

(2) Cut out the top of the can (code end), using a can opener that does not remove nor distort the double seam.

(3) With the cut top held on the can contents, invert the can, and drain the free liquid by gently pressing on the cut lid with the fingers so that most of the free liquid comes from the can.

(4) With the cut lid still in place, cut out the bottom of the can with the can opener, then turn the can upright and remove the cut can top (code end). Scrape off any adhering tuna particles into the tuna mass in the can.

(5) Place the proper size press cylinder as provided in paragraph (c) (1) of this section in a horizontal position on a table, then using the cut bottom of the can as a pusher, gently force the can contents from the can into the cylinder. Remove the bottom of the can that was used as the pusher and scrape any adhering particles from the can body and bottom of the can, and put them in the

(6) Place the cylinder plunger on top of the can contents in the cylinder. move the eyebolt and put the cylinder and plunger in position on the press (paragraph (c) (3) of this section).

(7) Begin the operation of the hydraulic ram of the press, and as soon as liquid is observed coming from the plunger start timing the operation. Apply pressure to the plunger slowly, so that a full minute is used to reach a pressure of 414 pounds per square inch on the can contents. Hold this pressure for 1 additional minute and then release the pressure. Tip the press cylinder so that any free liquid is drained out.

(8) Remove the piston from the pressing cup. Loosen the cake from the cup with a thin blade and remove the entire press cake as gently as possible, to keep the mass in a single cake during this operation. Place the cake and any pieces that adhered to the piston and pressing cup in a tared receiving pan and determine the weight of the pressed material.

(9) For cans larger than 401 x 206: Cut out the top of the can and drain off free liquid from the can contents as in subparagraphs (2) and (3) of this paragraph. Determine the gross weight of the can and remaining contents. a tared core cutter as provided for in paragraph (c) (2) of this section, cut vertically a core of the drained material in the can. Determine the weight of the core. With a thin spatula transfer the Grated _____ 38.3 core to the pressing cup for 401 x 206 cans. Determine the press weight as in the piston. The hole is for receiving a subparagraphs (5) and (8) of this para-ringbolt to assist in removing the piston graph. Remove the remaining drained contents of the can, reserving the contents for the determination of free flakes (subparagraph (11) of this paragraph), weigh the empty can, and calculate the weight of the total drained material. Calculate the weight of presscake on the entire can basis by multiplying the weight of the presscake of the core by the ratio of the weight of the drained contents of the can to the weight of the core before pressing.

(10) Repeat the press-weight determination on the remainder of the 24 cans and determine the average weight for the purpose of paragraph (a) of this

(11) Determination of free flakes: If the optional form of tuna ingredient is solid pack, determine the percent of free flakes. Only fragments that were broken in the canning procedure are considered to be free flakes. If the can is of such size that its entire drained contents were pressed as described in subparagraphs (1) to (8), inclusive, of this paragraph, examine the presscake carefully for free flakes; using a spatula, scrape free flakes gently from the outside of the cake. Examine the body of the presscake itself as carefully as possible for free flakes that may have been added in the packing. Weigh the total free flakes and determine the percent by weight of flakes to the total weight of presscake. If the can is of such size that a core was cut out for pressing as described in subparagraph (9) of this paragraph, make the examination for free flakes on a weighed portion of the drained material remaining after the core was removed. The weight of the portion should approximately equal the weight of the core before pressing. Carefully examine the weighed portion, pick out free flakes and weigh them. Calculate the weight of the free flakes as a percentage of the weight of the portion examined.

(12) Determination of particle size: If the optional form of tuna ingredient is chunks, flakes, or grated, the press-cake resulting from the operations described in subparagraphs (1) to (9), inclusive, of this paragraph is gently separated by hand, care being taken to avoid breaking the pieces. The separated pieces are evenly distributed over the top sieve of the screen separation equipment described in paragraph (c) (4) of this section. Beginning with the top screen. lift and drop each sieve by its open edge three times. Each time, the open edge of the sieve is lifted the full distance permitted by the device. Combine and weigh the material remaining on the three top screens (1½-inch, 1-inch, ½inch screens), and determine the combined percentage retention by weight in relation to the total press weight.

(c) (1) The pressing cups and pis-

from the pressing cup. Dimensions for pressing cups and pistons are as follows:

For can size 271 x 209

Inside depth, approximately 3¾ inches. Inside diameter, 2.593 inches. Wall thickness, approximately 3/8 inch. Piston:

Thickness, approximately 1 inch. Diameter, 2,568 inches

For can size 307 x 113

Pressing cup:

Inside depth, approximately 4 inches. Inside diameter, 3.344 inches. Wall thickness, approximately % inch. Piston:

Thickness, approximately 11/4 inches. Diameter, 3.319 inches.

For can size 401 x 206

Inside depth, approximately 41/2 inches. Inside diameter, 3.969 inches.
Wall thickness, approximately ½ inch,

Thickness, approximately 11/4 inches. Diameter, 3.944 inches.

For can sizes where the diameter is greater than 401, the core cutter described in subparagraph (2) of this paragraph shall be used and the resulting core pressed in the pressing cup for can size 401 x 206. For can sizes differing from those specified above, special pressing cups and pistons may be used. Special pressing cups have inside diameters 1/10-inch less than the outside diameters at the double seam for the can sizes for which the cups are used, and the piston diameters are 0.025 inch less than the inside diameters of the pressing cups.

(2) The core cutter referred to in paragraphs (b) (9) and (11) of this section and subparagraph (1) of this paragraph is made from a previously sealed 300 x 407 can. The cover, including the top seam, is cut out. The edge is smoothed and sharpened. A small hole to permit passage of air is made in the bottom.

(3) The hydraulic press referred to in paragraph (b) (6) to (10), inclusive, of this section is made by so mounting a hydraulic jack in a strong frame that it will press horizontally against the center of the piston in the pressing cup used The frame should be so braced that it does not change shape when pressure is applied. Provision is made for collecting the pressed-out liquid in a suitable receptacle. The gauge on the hydraulic jack is so calibrated that it will indicate for the piston being used when the piston is pressing against the contents of the pressing cup with a pressure of 414 pounds per square inch of piston face.

(4) The sieving device referred to in paragraph (b) (12) of this section consists of three sieves, each approximately 1 foot square, loosely mounted, one above the other, in a metal frame. The mesh in the top sieve complies with the speci-(c) The pressing cups and possible top sever compares with the spectrons referred to in paragraph (b) of fications for 1½-inch woven-wire cloth this section are made of stainless steel, as set forth in "Standard Specifications this section are made with a lip for Sieves," as published March 1, 1940, to facilitate collection of the liquid, in L. C. 584 of the U. S. Department of to facilitate collection of the inquid. In L. C. 584 of the U. S. Department of Pistons have a threaded center hole Commerce, National Bureau & Standabout half as deep as the thickness of ards. The meshes in the sieves below comply with similar specifications for

1-inch and 1/2-inch woven-mesh cloth as set forth in the same publication. The sides of each sieve are formed from 3/4inch metal strap. The frame has tracks made of 3/8-inch angle metal to support each sieve under each side. The tracks are so positioned as to permit each sieve a free vertical travel of 13/4 inches

- (d) If canned tuna falls below the applicable standard of fill of container prescribed in paragraph (a) of this section, the label shall bear the general statement of substandard fill provided in § 10.3 (b) of this chapter, in the manner and form therein specified.
- 2. The proposals of Hawaiian Tuna Packers Limited are as follows:
- a. That § 37.1 (g) and (h) in the above-proposed standard of identity for canned tuna be redesignated as (h) and (i), respectively, and that a new paragraph (g), reading as follows, be inserted
- (g) Any one of the forms of pack of canned tuna specified in paragraph (c) of this section may be smoked. Canned smoked tuna will be labeled in accordance with the provisions of paragraph (i) (5) of this section.
- b. In § 37.1 (i), redesignated as above, subparagraphs (5) and (6) would be redesignated as (6) and (7), respectively, and it is proposed that a new subparagraph (5), reading as follows, be inserted therein:
- (5) In case any of the forms of canned tuna specified in paragraph (c) of this section are smoked, the designation 'Smoked" shall appear on the label, as for example, "Light Smoked Tuna
- 3. The proposal of the California Fish Canners Association, Inc., is as follows: That the proposed standard of identity for canned tuna fish submitted by the National Canners Association et al. be amended to incorporate garlic as an ingredient, under § 37.1 (f) of the proposal. Paragraph (f) would read as follows:
- (f) Canned tuna may be seasoned or flavored with one or more of the following:
 - (1) Salt.
 - (2) Purified monosodium glutamate.
 - (3) Hydrolyzed protein.
- (4) Hydrolyzed protein with reduced monosodium glutamate content.
- (5) Spices or spice oils or spice extracts.
- (6) Vegetable broth or sauce, in an amount not in excess of 5 percent of the volume capacity of the container, such broth or sauce to consist of a minimum of 0.5 percent by weight of vegetable extractives and to be prepared from two or more of the following vegetables: Beans, cabbage, carrots, celery, garlic, onions, parsley, peas, potatoes, red bell peppers, green bell peppers, spinach, and tomatoes.

(7) Garlic.

Dated: August 20, 1956.

[SEAL] JOHN L. HARVEY. Deputy Commissioner

of Food and Drugs.



Department of the Interior

FISH AND WILDLIFE ACTIVITIES TO BE REORGANIZED:

Action has been initiated to reorganize the fish and wildlife activities of the Department of the Interior to carry out the provisions of the "Fish and Wildlife Act of 1956" (which was signed August 8 by the President), Secretary Fred A. Seaton announced on August 16.

Secretary Seaton described the new law as "an important step forward in providing greater recognition at the national level of the country's vital stake in fish and wildlife conservation."

"This Act," he said, "will enable the commercial fishing industry to attain its proper place in the national economy and will assure sportsmen that the Federal Government is increasing its management efforts to develop adequate fish and wildlife resources for recreational purposes."

Under the terms of the Act, two new top-level posts will be established. One will be an Assistant Secretary for Fish and Wildlife, and the other will be a Commissioner of Fish and Wildlife. Appointments to these positions will be made by the President and will be subject to Senate confirmation. Secretary Seaton said that no decision has been reached as to who will fill these two positions.

The new Assistant Secretary position is the first to be created since May 24, 1950, when four Assistant Secretaries were authorized by Congress. It is the first major reorganization of the Fish and Wildlife Service since 1940 when the Bureau of Biological Survey and the Bureau of Fisheries were combined to form the service.

The Act also provides for the creation within the Department of a new U.S. Fish and Wildlife Service which will replace the presently existing Fish and Wildlife Service. The new Service will consist of two separate agencies, each of which will have the status of a Federal bureau. One of these agencies will be known as the "Bureau of Commercial Fisheries" and the other as the "Bureau of Sport Fisheries and Wildlife." Each

bureau will be headed by a director who will be appointed by the Secretary of the Interior.

Both Directors will handle their responsibilities under the direction of the Commissioner who, in turn, will be subject to the supervision of the Assistant Secretary for Fish and Wildlife.

The Bureau of Commercial Fisheries will be responsible for all functions of the Service pertaining to commercial fisheries, whales, fur seals, sea lions, and related matters.

The new law directs the Secretary to effect the reorganization of the Service as soon as practicable but not later than 90 calendar days after its approval.

One of the new functions authorized by the Fish and Wildlife Act of 1956, and proposed by the Department of the Interior, is the making of loans at three percent interest to mature in not more than 10 years for "financing and refinancing of operations, maintenance, replacement, repair, and equipment of fishing gear and vessels, and for research into the basic problems of fisheries."

A fisheries loan fund will be created to be used by the Secretary as a revolving fund to make these loans. The Act authorized \$10 million to provide initial capital. The actual appropriation of this sum was included in the Second Supplemental Appropriation Act for 1957 passed by the 84th Congress shortly before adjournment.

Another highlight of the Fish and Wildlife Act of 1956, also proposed by the Department, is the extension of provisions of the Saltonstall-Kennedy Act of July 1, 1954. This Act gave the Department of the Interior, for a three-year period ending June 30, 1957, 30 percent of the gross receipts from duties collected under the customs laws on fishery products to promote the free flow of domestically-produced fishery products. The new law continues this arrangement on a permanent basis. The limitation of \$3 million annually on the funds has been removed and the money becomes available on an "annual accrual" basis. This is expected to increase the amount to about \$5 million.

Secretary Seaton pointed out that this balanced program of technological, economic, market development, and biological studies and services to aid the domestic fishing industry has been highly commended by the industry during its first two years of operation. At the last meeting of the American Fishery Advisory Committee, held in May at Long Beach, Calif., the committee went on record for an "enlarged and extended Saltonstall-Kennedy Act as the best way to aid the industry."

The Fish and Wildlife Act of 1956 also provides for the transfer to the Secretary of the Interior of "all functions of the Secretary of Agriculture, the Secretary of Commerce, and the head of any other department or agency, as determined by the Director of the Bureau of the Budget to relate primarily to the development, advancement, management, conservation, and protection of commercial fisheries." This provision, however, does not affect the authority of the Secretary of State to negotiate or enter into any international agreements or conventions concerned with fish and wildlife resources.

President Eisenhower in signing the bill (S. 3275) August 8, issued the following statement:

"In signing this bill, I do not regard as a directive the provisions of section 8 which relate to United States representation at international conferences and negotiations concerning fish and wildlife matters. If they were to be so construed they would, in my judgment, be unconstitutional as limitations on the authority of the President of the United States to conduct negotiations with other governments through agents designated by him or at his direction. Accordingly, I regard these provisions as merely an indication of the desire of the Congress that the resources of the Interior Department be utilized in the formulation of United States policies affecting fish and wildlife matters, which of course I fully share and which is and has been my policy.



Tariff Commission

TIME FOR REVIEW OF CUSTOMS TARIFF SCHEDULES EXTENDED:

Public Law 934, approved August 2, 1956, provides an extension of time for the Tariff Commission to complete the review of the customs tariff schedules authorized by section 101 of the Customs Simplification Act of 1954. The Tariff Commission is making a comprehensive study of the laws of the United States prescribing the tariff status of imported articles and will submit to the President and to the Chairmen of the Ways and Means Committee of the House of Representatives and the Finance Committee of the Senate, not later than March 1, 1958, a review and consolidation of these laws which, in the judgment of the Commission, will to the extent practicable: (1) establish schedules of tariff classifications which will be logical in arrangement and terminology and adapted to the changes which have occurred since 1930 in the character and importance of articles produced in and imported into the United States and in the markets in which they are sold; (2) eliminate anomalies and illogical results in the classification of articles; (3) simplify the determination and application of tariff classifications.

The Commission again invites importers, domestic producers, customs brokers, and other interested parties to submit any suggestions which in their opinion may accomplish the purposes indicated. The Commission is finding that suggestions previously submitted are most helpful in this undertaking, and additional suggestions will be appreciated. Suggestions should be in quintuplicate, and should be addressed to the General Counsel, United States Tariff Commission, Washington 25, D. C.

After the Commission has prepared a draft of revised tariff schedules, such draft will be made public and hearings will be scheduled for the purpose of affording interested parties opportunity to be heard with respect thereto, particularly with respect to the probable effect upon domestic industry of any changes in duties which may be involved in the proposed revision.

Copies of the Commission's Interim Report, dated March 15, 1955, treating the more fundamental problems underlying a simplification of the tariff schedules, the principles to be followed by the Commission in formulating the proposed revision of the tariff schedules, and methods for putting the proposed revision into force and effect, may be obtained from the Secretary, United States Tariff Commission, Washington 25, D.C.



Eighty-Fourth Congress (Second Session)

Listed below and on the following pages are public bills and resolutions



that directly or indirectly affect the fisheries and allied industries. Public bills and resolutions are shown when introduced; from month to month the more pertinent reports, hearings, or

chamber actions on the bills shown are published; and if passed, they are shown when signed by the President.

Both the House and Senate adjourned sine die on July 27, 1956. Bills introduced in either the first or second session of the 84th Congress which failed to pass during either session will have to be re-introduced in the 85th Congress (which convenes in January 1957).

COMMERCIAL FISHERIES EDUCATIONAL PROGRAM: S. 2379, a bill to promote the rishing mouse, united States and its Territories by providing for the train-2379, a bill to promote the fishing industry in the ing of needed personnel for such industry, Signed by the President August 8, 1956 (P. L. 1027).

> Public Law 1027 - 84th Congress Chapter 1039 - 2d Session S. 2379

> > ANACT

AN FUT All 70 Stat. 1126.

To promote the fishing industry in the United States and its Territeries by providing for the training of needed personnel for such industry.

providing for the training of needed personnel for such industry. Be it enacted by the 'Annet and Blense of Representatives of the United States of America in Congress assembled, That (a) the Sec. Printing industry, retary of the Interior is a unbroised to make grants, out of funds "personnel train-appropriated for the purposes of this section, to public and nonprofit the greats appropriated for the purposes of this section, to public and nonprofit the greats of the purpose of the section of the purpose of the section of the purpose of the section of the purpose of the content of the purpose of the section. The purpose of the purpose of the purpose of the section of the purpose of the section.

(c) The Secretary of the Interior may establish such regulations Regulations, as may be necessary to carry out the provisions of this section.

Sec. 2. (a) Section 3 (a) of the Vocational Education Act of 1946 60 Seat. 775. is amended by inserting after paragraph (4) the following new 20 USC 151.

is amended by inserting after paragraph (4) the following new ^{20 102 Obp}
paragraph:

"(5) \$375,000 for vocational education in the fishery trades and ^{4ppropriation},
industry and distributive occupations therein, to be apportioned for
industry and distributive occupations therein, to be apportioned for
as determined by the United States Commissioner of Education
and externation with the Secretary of the Interior, taking into
account the extent of the fishing industry of each State and Territory
as compared with the total fishing industry of the United States
(including Territories)."

(b) Section 3 (b) of such Act is amended by striking out "paragraphs (1) to (4)" and inserting in lieu thereof "paragraphs (1)

Approved August 8. 1956.

Approved August 8, 1956.

CUSTOMS SIMPLIFICATION ACT: H. R. 6040 (amended), a bill to amend certain administrative provisions of the Tariff Act of 1930 and to repeal obsolete provisions of the customs laws. Signed by the President August 2, 1956 (P. L. 927). The principal provision of the bill is that duries levied on imported products that are taxable according to their value shall, with certain exceptions, be primarily computed on the basis of "export value." A statement by the President on this bill pointed out in part: "... The heart of this measure is a revision of valuation procedures. This change will do more than any other single measure to free the importation of merchandise from customs complications and pitfalls for the inexperienced importer. It allows our customs value decisions to be based on normal commercial values current in trade with the United States. It permits businessmen to predict with greater certainty the amount of tariff duty to be paid on imports. It simplifies the valuation work of the Bureau of Customs and reduces delay in the assessment of

"I am also particularly gratified to approve H. R. 6040 because it marks the culmination of the legislative proposals which this administration has made for customs simplification and customs management improvement. The Customs Simplification Act of 1953 made many important changes in customs administrative provisions which have resulted in more certain and equitable duty assessments. The Customs Simplification Act of 1954 began a study by the United States Tariff Commission looking toward a much-needed revision of the tariff classification schedules of 1930 and made helpful changes in the administration of the antidumping laws. With the passage H. R. 6040 all of the principal improvements re-lating to customs procedures recommended on January 23. 1954, by the Commission on Foreign Economic Policy, which I endorsed in my special message of March 30, 1954, have now been authorized or undertaken.

"The legislation previously passed by the Congress, together with the regulatory and administrative changes made by the Treasury Department and the Bureau of Customs, have in the past 3 years cut the average time required for a final decision on customs duties from about 1 year to less than 6 months. Further progress in this direction is expected, and I am confident that H. R. 6040 will contribute to it. ...

H. R. 12254, a bill to provide additional time for the Tariff Commission to review the customs tariff schedules. House Committee on Ways and Means reported to House July 19 with amendment (H. Rept. No. 2815). House amended and passed July 21. Referred to Senate Committee on Finance, reported by that Committee to Senate July 25 (S. Rept. No. 2780), and passed Senate July 26. Signed by the President August 2, 1956 (P. L. 934).

Provides additional time for the Tariff Commission to complete the review of the customs tariff schedules authorized by section 101 of the Customs Simplification Act of 1954. As matters now stand, the Tariff Commission is making a comprehensive study of the laws of the United States prescribing

the tariff status of imported articles and will submit to the President and to the Chairmen of the Ways and Means Committee of the House of Representative and the Finance Committee of the Senate, not later than March 1, 1958, a review and consolidation of these laws which, in the judgment of the Commission, will to the extent practicable: (1) Establish schedules of tariff classifications which will be logical in arrangement and terminology and adapted to the changes which have occurred since 1930 in the character and importance of articles produced in and imported into the United States and in the markets in which they are sold. (2) Eliminate anomalies and illogical results in the classification of articles. (3) Simplify the determination and application of tariff classifications.

FISH AND WILDLIFE ACT OF 1956: S. 3275, a bill to establish a sound and comprehensive national policy with respect to fisheries and wildlife; to strengthen the fisheries and wildlife segments of the national economy; to create and establish within the department of the Interior the Office of Assistant Secretary for Fisheries and Wildlife, a United States Fish and Wildlife Service; and for other purposes. Signed by the President August 8, 1956 (P. L. 1024). A statement by the President on this bill indicated: "I have signed S. 3275, The Fish and Wildlife Act of 1956. In signing this bill, I do not regard as a directive the provisions of section 8 which relate to United States representation at international conferences and negotiations concerning fish and wildlife matters. If they were to be so construed they would, in my judgment, be unconstitutional as limitations on the authority of the President of the United States to conduct negotiations with other governments through agents designated by him or at his direction. Accordingly, I regard these provisions as merely an indication of the desire of the Congress that the resources of the Interior Department be utilized in the formulation of United States policies affecting fish and wildlife matters, which of course I fully share and which is and has been my policy.

Public Law 1024 - 84th Congress Chapter 1036 - 2d Session S. 3275

AN ACT

All 70 Stat. 1119.

o establish a sound and comprehensive national policy with respect to fish and wildlife; to strengthen the fish and wildlife segments of the national economy; to establish within the Department of the Interior the position of Assistant Secretary for Fish and Wildlife; to establish a United States Fish and Wildlife; to establish a United States Fish and Wildlife; Secrice; and for other natureses.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That this Act may Fish and Wildlife Act of 1986".

11re Act of United States of America in Congress assembled, That this Act may Fish and Wildlife Act of 1986".

Src. 2. The Congress hereby declares that the fish, shellfish, and wildlife resources of the Nation make a material contribution to our national economy and food supply, as well as a material contribution to resource are a living, renewable form of national wealth this capable of being maintained and greatly increased with proper management, but engalty capable of destruction if neglected or unwisely ment, but engalty capable of destruction if neglected or unwisely the Nation and provide employment, directly or indirectly, to a substantial number of citizens; is that the fishing industries strengthen the defense of the United States through the provision of a trained seatnatial number of citizens; is that the fishing industries strengthen the attoinal defense by contributing to the general bealth and physical fishess of millions of citizens; and that properly developed, such fish able contributions to the life of the Nation.

The Congress further declares that the fishing industry, in its several branches, can prosper and thus fulfill its proper function in national functions of governments. Among these needs are:

(1) Freedom of enterprise—Freedom to develop new areas, methods, used to the contribution of citizens; reflected to the value of the consistent with the public interest and in accord with constitutional functions of governments. Among these needs are:

(1) Freedom of enterprise—Freedom to develop new areas, methods, used to the contribution of protection of opportunity—maintenance of an economic atmosticus that unreasonably condities with ori ignore economic needs;

(2) Protection of opportunity—maintenance of an economic atmosticus that unreasonably condities with originary contribution of the contribution of the protection of opportunity to fish on the high seas in accordance with international law;

(3) Assistance—assistance consistent with that provided by the fovernment for industry generally, such as is involved in

good industrial relations, fair trade standards, harmonious labor relations, better health standards and sanitation; and including, but

(a) services to provide current information on production and trade, market promotion and development, and an extension

(b) research services for economic and technologic development

(b) research services for economic and technologic development and resource conservation, an assure the maximum sustainable production for the fisheries production for the fisheries that the provisions of this Act are necessary in order to accomplish the objective of proper resource development, and that this Act shall be administered with due regard to the inherent right of every citizen and resident of the United States

to the inheritating in a very custom and estation to the Chined states to engage in lishing for his own pleasure, enjoyment, and betterment, and with the intent of maintaining and increasing the public opportunities for recreational use of the control of the strong, prosperous, and thriving fishery and fish processing industry.

REORGANIZATION WITHIN THE DEPARTMENT OF THE INTERIOR

Secretary and Grab processing industry.

Secretary and Grab processing industry.

Secretary and Grab particular to the particular of the Interior the position of Assistant Secretary for Fish and Wildlife, and the analysis of Fish and Wildlife, and the processing of Fish and Wildlife and the property of the Persident by and with the advice and consent of the Sentate, and shall be compensated at the same rate of the Company of the Company of the Sentate and Shall be compensated at the same rate of the Sentate and Company of the Company of the Sentate and Company of the Sentate Sentate and Company of the Sentate Sen

soul occurrence.

(e) Except as changed by the terms of this Act or by subsequent laws or regulations, all laws and regulations now in effect relating to matters herefore administerably the Department of the International through the former Fish and Wildlife Service as heretofore existing, shall remain in effect.

Administrative procedures.

shall remain in enect.

(f) In recognition of the need for authority to execute the purposes of this Act effectively, the Secretary of the Interior shall exercise such of his Act effectively, the Secretary of the Interior shall exercise such general administrative authorize consistently with the terms of this Act as he shall find to be necessary to carry out the provisions of this Act effectively and in the public interest. In order to allow sufficient time to place the reorganizations under this Act into effect, the Secre-tary is authorized to establish an effective procedure and date of such reorganizations, notice of which shall be published in the Federal Register. Such order proposed of this Act, but not later than ninety (90) cathedard are the appropriate of this Act, but not later than ninety (90) cathedard are the appropriate of the Act, but not later than ninety. of notice in

Sec. 4. (a) The Secretary is authorized under rules and regulations and under terms and conditions prescribed by him, to make loans for financing and refinancing of operations, maintenance, replacement, repair, and equipment of fishing gear and vessels, and for research into the basic problems of fisheries.

(b) Any loans made under the provisions of this section shall be to the provision of this section shall be careful. (c) and the provision of the section shall be careful to the section of the section of the section unless reasonable financial assistance applied for is not otherwise available on reasonable terms. a fisheries loan fund, which shall be used by the Secretary as a revolving fund to make loans for financing and refinancing under this section. Any funds received by the Secretary on or before June 30, 1965, in payment of principal or interest and pleases on made, shall be deposited in the fund and be available on reasonable from the section. Any funds so received after June 30, 1965, and any belatis section. Such gunds or ceived after June 30, 1965, and any belatis section. Such gunds shall case to exist), shall be covered into the Treasury as miscellaneous receipts. There

67 Stat. 29.

are hereby authorized to be appropriated to the fund the sum of \$10,000,000 to provide initial capital.

(d) The Secretary, subject to the specific limitations in this section, may consent to the modification, with respect to the rate of interest, time of payment of any installment of principal, or security, of any loan contract to which he is a party.

INVESTIGATIONS, INFORMATION, REPORTS

Sec. 5. (a) The Secretary shall conduct continuing investigations, prepare and disseminate information, and make periodical reports to the public, to the President, and to Congress, with respect to the fol-

lowing matters:
(1) The production and flow to market of fish and fishery products (1) The produced and also those produced by foreign produces domestically produces, and also those produced by foreign producers which affect the domestic fisheries;
(2) The availability and abundance and the biological requirements of the fish and wildlife resources;

(3) The competitive economic position of the various fish and fishery products with respect to each other, and with respect to competitive domestic and foreign-produced commodities;

(4) The collection and dissemination of statistics on commercial

and sport fishing;

- (5) The collection and dissemination of statistics on the nature and availability of wildlife, progress in acquisition of additional refuges and measures being taken to foster a coordinated program to encourage and develop wildlife values;
- (6) The improvement of production and marketing practices in regard to commercial species and the conduct of educational and extension services relative to commercial and sport fishing, and wildlife matters;

(7) Any other matters which in the judgment of the Secretary are of public interest in connection with any phases of fish and wildlife operations.

TRANSFER OF FUNCTIONS-ASSISTANCE OF OTHER AGENCIES

SEC. 6. (a) There shall be transferred to the Secretary all functions of the Secretary of Agriculture, the Secretary of Commerce, and the head of any other department or agency, as determined by the Director of the Bureau of the Budget to relate primarily to the devel-Director of the Bureau of the Budget to relate primarily to the development, advancement, management, conservation, and protection of commercial fisheries; but nothing in this section shall be construed to modify the authority of the Department of State or the Secretary of State to negotiate or enter into any international agreements, or conventions with respect to the development, management, or protection of any fisheries and wildlife resources or with respect to international companions conventions. tional commissions operating under conventions to which the United States is a party

(b) There shall be transferred to the Department of the Interior so much of the personnel, property, facilities, records, and unexpended halness of appropriations, allocations, and other funds (available or to be made available) as the Director of the Bureau of the Budget determines to be necessary in connection with the exercise of any functions transferred to the Secretary pursuant to subsection (a) of this

section

section.

(c) The Secretary may request and secure the advice or assistance of any department or agency of the Government in carrying out the provisions of this Act, and any such department or agency which furnishes advice or assistance to the Secretary may expend its own funds for such purposes, with on without reimbursement from the Secretary as may be agreed upon between the Secretary and the department or agency.

POLICIES, PROCEDURES, RECOMMENDATIONS

SEC. 7. (a) The Secretary of the Interior, with such advice and assistance as he may require from the Assistant Secretary for Fish and assistance as he may require from the Assistant Secretary for Fish and Wildlife, shall consider and determine the policies and procedures that are necessary and desirable in carrying out efficiently and in the public interest the laws relating to fish and wildlife. The Secretary, with the assistance of the departmental staff herein authorized, shall—(1) develop and recommend measures which are appropriate to assure the maximum sustainable production of fish and fishery

products and to prevent unnecessary and excessive fluctuations

in such production;

in such production;
(2) study the economic condition of the industry, and whenever he determines that any segment of the domestic fisheries has been seriously disturbed either by wide fluctuation in the abundance of the resource supporting it, or by unstable market or fishing conditions or due to any other factors he shall make such appropriate to aid in stabilizing the domestic fisheries he deems appropriate to aid in stabilizing the domestic fisheries (3) develop and recommend asserial womendiamed asserial womendiamed in the contractions of the contraction of the contraction

(3) develop and recommend special promotional and informa-tional activities with a view to stimulating the consumption of fishery products whenever he determines that there is a prospec-

tive or actual surplus of such products;

(4) take such steps as may be required for the development, advancement, management, conservation, and protection of the

(3) take such steps and be required for the development, amangement, advancement, conservation, and protection of wild-ife resources through research, acquisition of refige lands, development of existing facilities, and other means.

STATE DEPARTMENT-COOPERATION

SEC. 8. (a) The Secretary shall cooperate to the fullest practicable extent with the Secretary of State in providing representation at all meetings and conference relating to fish and wildlife in which representatives of the United States and foreign countries participate.

The Secretary of State shall designate the Secretary of the Interior The Secretary of State shall designate the Secretary of the Interior and the Secretary of State shall designate the Secretary of the Interior and the Secretary of the Interior and the Interior and Secretary of Secr

such negotiators, in any case in which has produces are directly aneeded by such negotiators spranged and other organizations and agencie ermental, private nonprofit, and other organizations and agencie which have to do with any phase of fish and wildlife with respect to any problems that may arise in connection with such fish and wildlife

REPORTS ON ACTIVITIES AND IMPORTS

SEC. 9. (a) The Secretary of the Interior shall make an annual Report to report to the Congress with respect to activities of the United States frequency of the Congress with respect to activities of the United States from the Congress with respect to activities of the United States from the Congress with respect to the Congress of the Congress of

of the line or currectly competitive product of the dimension mustry; and
(2) whether there has been an increase in the imports of the fishery products into the United States, either actual or relative to the production of the like or directly competitive product pro-duced by the domestic industry.

THE RIGHTS OF STATES

Sec. 10. Nothing in this Act shall be construed (1) to interfere in any manner with the rights of any State under the Submerged Lands Act (Public Law 3), Eighty-hird Congress) or otherwise provided cased by the States either individually or under interstate compacts; or (2) to interfere in any manner with the authority exercised by any International Commission established under any treaty or convention to which the United States is a party.

AUTHORIZATION FOR APPROPRIATION

Siz. 11. There are hereby authorized to be appropriated such sums as may be necessary to carry out the provisions of this Act. Siz. 12. (a) The authorization for the transfer of certain funds from the Secretary of Agriculture to the Secretary of the Interior and their maintenance in a separate fund and the Size of th

after.
(b) Subsection (e) of section 2 of the aforesaid Act of August 11, 1939, as amended, is hereby amended to read as follows:
"(e) The separate fund created for the use of the Secretary of the Interior under section 2 (a) of this Act and the annual accruals thereto shall be availed be for each year hereafter until expended by the Secretary of the Secretary

Approved August 8, 1956.

FISH HATCHERIES: S. 3831, a bill to provide for the establishment of a fish hatchery in West Virginia. Signed by the President August 6, 1956 (P. L. 990).

S. 3998, a bill providing for the development of a Federal fish hatchery known as Holden Trout Hatchery at Pittsford, Vt. Signed by the President August 1, 1956 (P. L. 889).

 \underline{H} , \underline{R} , $\underline{11548}$, a bill to establish a new fish hatchery in the vicinity of Paint Bank, Va. Signed by the President August 3, 1956 (P. L. 972).

H, R, 12438 (Gavin), introduced in the House July 26, a bill to provide for the establishment of a fish hatchery in northwestern part of Pennsylvania; to the Committee on Merchant Marine and Fisheries.

H. R. 12454 (Reuss), introduced in the House July 27, a bill to provide for the establishment of a fish hatchery in

Wisconsin; to the Committee on Merchant Marine and Fisheries

FISHING VESSEL MARINE INSPECTION: H. R. 9047, a biff for the safety of life and property by making all commercial fishing vessels subject to the rules and regulations of the U. S. Coast Guard Marine Inspection. A subcommittee has been appointed by the House Committee on Merchant Marine and Fisheries to investigate the improvement of small boat safety. The subcommittee was scheduled to visit a number of West Coast ports, starting with hearings at Astoria August 30, 1956. Subsequent hearings were to be scheduled at Tacoma and Seattle, Wash., and California ports.

GREAT LAKES FISHERIES COMMISSION; S. 3524, a bill to give effect to the Convention on Great Lakes Fisheries signed at Washington September 10, 1954, and for other purposes. House passed this bill on May 21 and cleared it for the President, Signed by the President June 4, 1956 (P. L. 557).

House Report No. 2154, Giving Effect to the Convention of Great Lakes Fisheries Signed at Washington September 10, 1954 (May 14, 1956, 84th Congress, 2nd Session) to accompany §, 3524, 10 pp., printed, Discusses the purpose and background of the bill, and presents the statements by various Federal agencies.

NITERIOR DEPARTMENT APPROPRIATIONS: H. R. 9390, fiscal 1957 appropriations for Interior Department and related agencies (including the Fish and Wildlife Service), Signed by the President June 13, 1956 (P. L. 573).

House Report No. 2250, Department of the Interior and related agencies Appropriation Bill, 1957 (May 31, 1956, 94th Congress, 2nd Session), conference report to accompany H. R. 9390, 5 p., printed. Points out the conference agreements.

SEA NETTLES AND JELLYFISH RESEARCH; S. 3955, a bill to authorize research by the Fish and Wildlife Service to determine methods of, and to provide grants to the states to assist approved research or other projects for, control or extermination of sea nettles and jellyfish in marine waters of the United States. Senate Interstate and Foreign Commerce Committee reported the bill to the Senate July 20, 1956, with amendments. Senate passed amended bill July 23, 1956, on call of calendar.

SHELLFISH RESEARCH LABORATORY: S. 3827, a bill to authorize the construction of a shellfish research laboratory and experiment station in the Chesapeake Bay area. Senate Interstate and Foreign Commerce Committee reported the bill to the Senate July 18, with amendments, Senate passed July 23, 1956, amended, on call of the calendar.

SUPPLEMENTARY APPROPRIATIONS: H. R. 12138, a bill making supplemental appropriations for fiscal year 1957 (provides among other things for \$620,000 for the Great Lakes Fisheries Commission). Signed by the President July 27, 1956 (P. L. 814).

H. R. 12350, a bill making second supplemental appropriations for the fiscal year ending June 30, 1957, and for other purposes. (Provides among other things for supplemental appropriations for the U, S, Fish and Wildlife Service including an additional amount of \$1,250,000 for construction to be available until expended, principally for hatcheries, and initial capital of \$10,000,000 for the "Fisheries Loan Fund," a revolving fund for financing and refinancing of operations,

maintenance, replacement, repair, and equipment of fishing gear and vessels and for research into the basic problems of fisheries.) Signed by the President July 31, 1956 (P. L. 855).

TARIFFS AND TRADE STUDY. The House Ways and Means Committee has appointed a special Subcommittee on Customs, Tariffs and Reciprocal Trade Agreements "to conduct an investigation and study of all aspects of our customs, tariffs, trade agreements authority and trade agreements entered into thereunder."

The subcommittee announced the latter part of August that its study was scheduled to get under way with two weeks of public hearings beginning September 17.

Chairman of the new subcommittee is Representative King (Galif), Other members of the group are Representative King (Galif), Harrison (Va), McCarthy (Minn), Machrowick (Mich.), Reed (N. Y.), Sadlak (Wis.), Curtis (Mo.), and Byrnes (Wis.)

Chairman Bogos announced that the subcommittee desires to obtain "balanced and objective information factually presented on all aspects of our customs and tariff laws and the trade agreements program," The agenda of the subcommittee includes testimony on

"A. United States Trade Policy and the National Interests. It is expected under this subject to develop basic information on the position of the United States in the world economy, on the significance of trade policy to our domestic economy and to our international objectives, and on the fundamental trade problems and issues confronting the United States;

"B. The pattern of foreign trade, It is expected this subject will develop our current knowledge about the economic forces which cause trade to take place and which influence adjustment in the composition of our imports and exports, including balance of payments and world trade and payments factors;

"C. Foreign trade, trade policies, trade agreements program and related commercial policies and the United States economy. It is expected this topic will develop information on the significance, impact, and effect of imports and exports on the United States economy in its entirety and on the particular segments thereof, including industry, labor, agriculture, and distribution and transportation, in the context of the general national interest."

TRUCK TRIP LEASING: S, 898, a bill to amend the Interstate Commerce Act with respect to the authority of the Interstate Commerce Commission to regulate the use by motor vehicles not owned by them. Signed by the President August 3, 1956 (P. L. 957). Congressman Oren Harris included the following summary of the bill in the July 31 Congressional Record; "Summary of Provisions of Trip-Leasing Legislation, 5, 1998. 94th Congress.

"The legislation would authorize the Interstate Commerce Commission to exercise certain regulatory control over the leasing of motor vehicles by motor common and contract carriers, when such vehicles are to be driven for the carriers by the owner, or an employee of the owner, of the vehicle. This legislation is not concerned with the leasing of a motor vehicle when such vehicle is leased without the services of a driver.

"The Commission is granted authority by this legislation to prescribe regulations as to certain contents of the lease, and regulation which would assure that the motor carrier would have full direction and control of the leased vehicle and be fully responsible for its operation. The Commission is also given authority to establish requirements with respect to inspection and the safety of operation of such vehicles.

"However, the Commission is denied authority to regulate the duration of a trip-lease of a motor vehicle, with driver, or the amount of compensation for the use of such vehicle, when the vehicle is that of (1) a farmer, (2) a farmer-cooperative organization or federation, or (3) a for-hire of private carrier when such vehicle has completed a movement of property specified in the agricultural exemptions specified in section 203 (b) (6) of the Interstate Commerce Act. Under this section, motor vehicles used in carrying property consisting of ordinary livestock, fish (including shellfish), or agricultural (including horticultural) commodities (not including manufactured products thereof), are exempted from economic regulation by the Commission, but are subject to its safety regulations.

"In other words, regulated motor common and contract carriers would be permitted to trip lease the motor vehicle, with driver, of a farmer, a farm cooperative association or federation, or the motor vehicle of a for-hire or private carrier which has completed a movement of property specified in section 203 (b) (6) of the act, Also, regulated motor carriers would be permitted to trip lease the motor vehicle of a private carrier when such vehicle is used regularly in the transportation of perishable products manufactured from property specified in section 203 (b) (6). Examples of such perishable products are frozen orange juice, or frozen vegetables.

"The direction of movement of the trip-leased vehicle is limited generally to a single movement or one or more of a series of movements, in the general direction of the general area in which the trip-leased vehicle is based,

"A more detailed statement of this legislation is given in $\underline{\text{House}}$ $\underline{\text{Report}}$ No. $\underline{2425}$, 84th Congress."



FISHERIES RADIO NETWORK IN JAPAN

In Japan there are more than 3,000 radio-equipped fishing boats which together with 77 fisheries radio stations on land, distributed throughout the Japanese islands, form a radio network in the promotion of efficient fishing operations. At present 56 frequencies are allocated to the fisheries radio communication system, distributed according to districts and the type of fisheries. Some of the shore stations are owned by the National Fisheries Research Laboratories, many by prefectural fisheries institutions, and a few by private companies.

The largest radio network in Japan covers the skipjack and tuna fishing fields. It has over 1,000 widely-distributed boats, and all prefectures facing the Pacific Ocean have one to three land stations. Communication with these fisheries is continuous throughout the day on many frequencies, making it possible to know the conditions of the fishing grounds, and location of schools of fish, as well as the position of each boat and to provide prompt action in event of distress. Other functions include arranging for the landing and marketing of the catch and the preparations required for the next voyage. These messages between fishing boats and stations are of a commercial nature, but there is another government network for the guidance of fishing vessels, namely the prefectural land stations which receive information from their fisheries guidance boats which is then broadcast to the commercial fishing fleet. However, the scale of this network is not large at present.

The only systematic analysis of these functions is carried on by the Tohoku Regional Fisheries Research Laboratory under the Fisheries Agency. The oceanographic environments, circumstances of the fishing grounds and other valuable information along the northeastern sea area of the Japanese Pacific coast are sent via the Ishinomaki fisheries radio station, and during peak skipjack and albacore fishing around Izu peninsula, similar information is sent to this area via the Yaizu fisheries radio station. One of the major functions of the Tohoku Laboratory is the research of skipjack fisheries throughout the entire Pacific waters.

The main work of this fisheries guidance system is to broadcast the synoptic isothermal chart. This is made up from data received daily from many fishing boats and whalers operating in these waters, together with oceanographic data sent from fisheries guidance boats of each prefecture and the marine observation vessels of the various Japanese agencies. Assembled, the results are then broadcast and are interpreted by the fishing vessels which make up their own isothermal charts on board so that they may study and investigate the daily oceanographic environmental conditions.

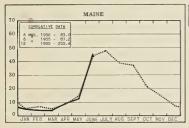
The Tohoku Regional Fisheries Research Laboratory also trains fishermen to plot and interpret the isothermal chart. The fishermen have shown great interest in this study.

--Indo-Pacific Fisheries Council-FAO, Proceedings 5th Meeting, Bangkok, Thailand (January 22-February 5, 1954).

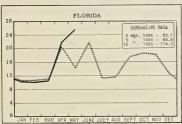


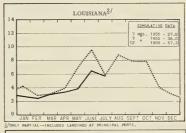
CHART I - FISHERY LANDINGS for SELECTED STATES

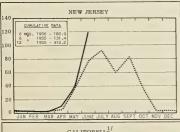
In Millions of Pounds

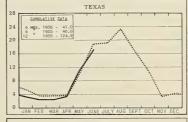


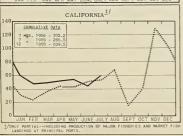












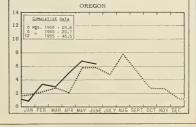
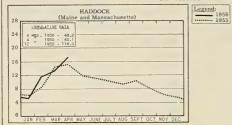
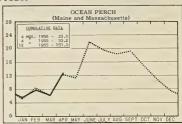


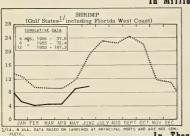
CHART 2 - LANDINGS for SELECTED FISHERIES

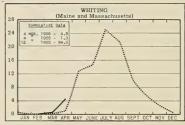
In Millions of Pounds



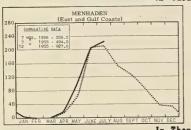


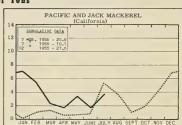
In Millions of Pounds



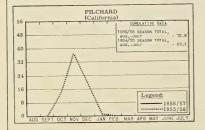


In Thousands of Tons





In Thousands of Tons



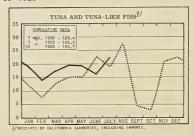
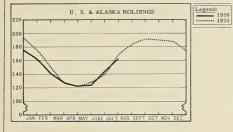


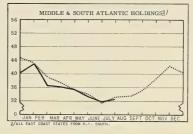
CHART 3 - COLD-STORAGE HOLDINGS and FREEZINGS of FISHERY PRODUCTS ★

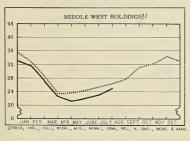
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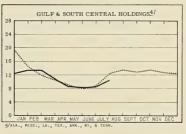


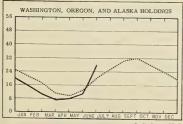








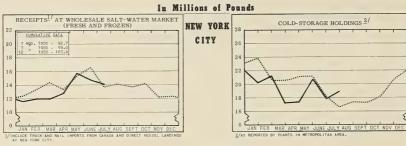


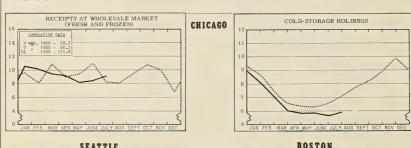




*Excludes salted, cured, and smoked products

CHART 4 - RECEIPTS and COLD-STORAGE HOLDINGS of FISHERY PRODUCTS at PRINCIPAL DISTRIBUTION CENTERS





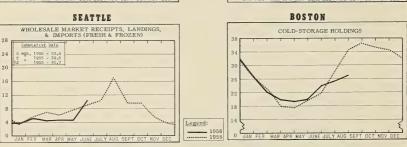
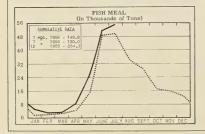


CHART 5 - FISH MEAL and OIL PRODUCTION - U.S and ALASKA



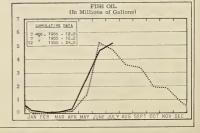
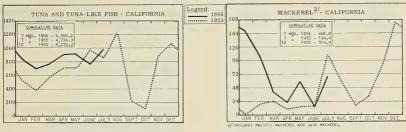
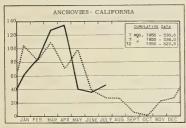
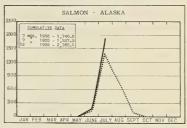


CHART 6 - CANNED PACKS of SELECTED FISHERY PRODUCTS

In Thousands of Standard Cases







1400	SARDINE	ES1/ (EST	'IMATED	- MAIN	E
	ULATIVE DATA	7	1 1		1 1
1200 7 Mgs	, 1956 - 1,16	7.7			
12 "	. 1956 - 1,16 1955 - 68 1955 - 1,26	2.7 8.8			
000 112	.,		~		
800					
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600			/		
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400		/			
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JAN F		MAY JUN	E JULY AUG	SEPT OCT	NOV DEC
INCLUDING	SEA HERRING.				

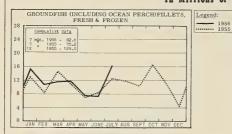
Variety	No. Cans	Can Designation	Net V	Vgt
SARDINES	100	1/4 drawn	$3\frac{1}{4}$	oz
SHRIMP	48		5	oz
TUNA	48	No. ½ tuna	6 & 7	oz
PILCHARDS	48	No. 1 oval	15	oz
SALMON	48	1-pound tall	16	oz
ANCHOVIES	48	½ lb.	8	oz



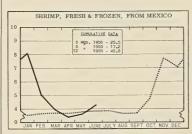


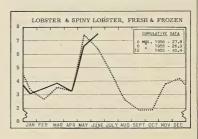
CHART 7 - U.S. FISHERY PRODUCTS IMPORTS

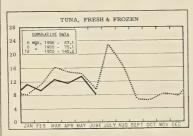
In Millions of Pounds

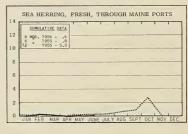


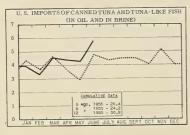


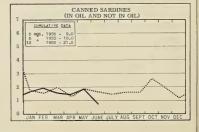


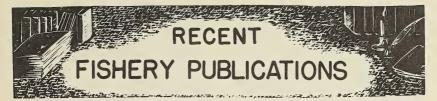












FISH AND WILDLIFE SERVICE **PUBLICATIONS**

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AND ALASKA,

FL - FISHERY LEAFLETS,

STATISTICAL SECTION LISTS OF DEALERS IN AND PRODUCERS OF FISHERY PRODUCTS AND SYRROUCTS,

SSR. - FISH - SPECIAL SCIENTIFIC REPORTS--FISHERIES

(LIMITED DISTRIBUTION).
SEP. - SEPARATES (REPRINTS) FROM COMMERCIAL FISHERIES REVIEW.

Number Title CFS-1317 - Massachusetts Landings, January 1956, 3 pp.

CFS-1337 - Mississippi River Fisheries, 1954, 6 pp.

CFS-1349 - Shrimp Landings, April 1956, 4 pp. CFS-1350 - Frozen Fish Report, May 1956, 8 pp. CFS-1358 - Florida Landings, March 1956, 6 pp. CFS-1360 - Imports & Exports of Fishery Prod-

ducts, 1951-1955, Annual Summary, 10 pp CFS-1361 - Massachusetts Landings, February

1956, 4 pp. CFS-1362 - Lake Fisheries, 1954 Annual Summary, 11 pp.

CFS-1364 - California Landings, March 1956, 4 pp. CFS-1365 - Fish Meal and Oil, May 1956, 2 pp.

CFS-1366 - Pacific Coast States Fisheries, 1954

Annual Summary, 7 pp.
CFS-1367 - Texas Landings, May 1956, 3 pp.
CFS-1368 - North Carolina Landings, May 1956, 3 pp.

CFS-1370 - Georgia Landings, May 1956, 2 pp. CFS-1371 - Frozen Fish Report, June 1956, 8 pp. CFS-1372 - New York Landings, May 1956, 4 pp.

CFS-1373 - Rhode Island Landings, May 1956, 3 pp. CFS-1374 - Gulf Fisheries, 1954 Annual Summary,

9 pp. CFS-1375 - South Atlantic Fisheries, 1954 Annual

Summary, 9 pp. CFS-1376 - New Jersey Landings, May 1956, 4 pp.

CFS-1377 - Maine Landings, May 1956, 4 pp. CFS-1378 - Massachusetts Landings, March 1956,

5 pp. CFS-1379 - Shrimp Landings, May 1956, 4 pp.

CFS-1380 - Fish Stick Report, April-June 1956, 2 pp. CFS-1381 - Ohio Landings, June 1956, 2 pp.

CFS-1383 - Alabama Landings, May 1956, 2 pp. CFS-1384 - Fish Meal and Oil, June 1956, 2 pp. CFS-1392 - Mississippi Landings, May 1956, 2 pp.

FL - 435 - Major Commercial Fisheries with

Data on Research Expenditures, 22 pp.

FL - 436 - Commercial Possibilities and Limitations in Frog Raising, 4 pp.

Wholesale Dealers in Fishery Products (Revised): SL - 13 - North Carolina, 1956, 6 pp.

SL - 14 - South Carolina, 1956, 2 pp.

SL - 20 - Texas, 1956, 3 pp.

Firms Canning (Revised):
SL - 101 - Salmon, 1955, 3 pp.
SL - 106 - Shad or Shad Roe, 1955, 1 p.
SL - 107 - Fish and Shellfish Specialties, 1955, 7 pp.

SL - 109 - Caviar and Fish Roe, 1955, 2 pp.

SL - 110 - Oysters, 1955, 2 pp.

SL - 111 - Clam Products, 1955, 2 pp. SL - 113 - Crab Meat, 1955, 2 pp.

SL - 116 - Food for Animals, from Marine-Animal Products, 1955, 2 pp.

SL - 118 - Groundfish Flakes, 1955, 1 p.

Firms Manufacturing (Revised):

SL - 151 - Fish Meal, Scrap, Body & Liver Oils, 1955, 8 pp. SL - 152 - Oyster Shell Products, 1955, 2 pp.

SL - 153 - Fish Glue and Isinglass, 1955, 1 p.

SL - 154 - Seaweed Products, 1955, 1 p. SL - 155 - Marine Pearl Shell Buttons, 1955, 1 p.

SL - 156 - Pearl Essence, 1955, 1 p. SL - 159 - Fresh-Water Mussel-Shell Products,

1955, 1 p.

SL - 160 - Menhaden Oil and Meal, 1955, 1 p.

SSR-Fish. No. 175 - Sea Lamprey Control on the Great Lakes, 1953 and 1954, by Leo F. Erkkila, Bernard R. Smith, and Alberton L. McLain, 30 pp., illus., processed, May 1956. Development of electromechanical devices permitted practical application of sea-lamprey control in Great Lakes streams. The barriers were energized by 110-volt, 60-cycle, alternating current. Sea lampreys were effectively blocked in their upstream spawning migration. Traps were installed in the control structures to pass migratory fish upstream. The extent of fish mortality at the electrical barriers was influenced by stream velocities, conductivity of the water and stream bottom, and size and location of the traps. Biological data on the sea lampreys were collected at the control structures. Each stream appeared to have its own electrical characteristics. Several factors influencing the electrical fields were determined. Present information indicates limited possibility of improving the electrical field to reduce fish mortality.

Sep. No. 444 - New Products from Fish Oils,

Part I - Introduction, Sep. No. 445 - "Brown-Spotting" in the Southern Oyster. Sep. No. 446 - Fishery Tariff Concessions in

1956 Geneva Negotiations.

THE FOLLOWING SERVICE PUBLICATIONS ARE AVAILABLE ONLY FROM THE SPECIFIC OFFICE MENTIONED:

- California Fisheries Trends and Review for 1954, by V. J. Samson, 33 pp., processed. (Avail-able free from the Market News Service, U. S. Fish and Wildlife Service, Post Office Bldg., San Pedro, Calif.) This is a review of the 1954 trends and conditions in the California fisheries. Among the subjects discussed are the tuna fishery (cannery receipts, total pack for 1945-1954, ex-vessel prices, domestic catch and fishing conditions, imports of frozen tuna, and canned tuna market conditions and price quotations); California sardine (pilchard) fishery (landings, ex-vessel prices, canned pack, and canned sardine prices); mackerel fishery (cannery receipts and ex-vessel prices); anchovy fishery; and imports of fishery products. Included in the statistical tables are data on tuna receipts and canned pack by months and species; landings and products of sardines (pilchards) by months, products, and areas; landings and pack of mackerel and jack mackerel by species and months; production of miscellaneous fishery products; freezings of fish and shellfish; cold-storage holdings; landings of market fish and shellfish at certain California ports; and imports of fishery products into California and Arizona.
- Boston Fishery Products Monthly Summary, May 1956, 15 pp.; Boston Fishery Products Monthly Summary, June 1956, 15 pp. (Market News Service, U. S. Fish and Wildlife Service, 10 Commonwealth Pier, Boston 10, Mass.) Landings and ex-vessel prices for fares landed at the Boston Fish Pier and sold through the New England Fish Exchange; and Boston frozen fishery products prices to primary wholesalers; for the months indicated,
- (New York) Monthly Summary May 1956 Receipts of Fishery Products at the New York
 City Wholesale Salt-Water Market, 4 pp. (Market News Service, U. S. Fish and Wildlife
 Service, 155 John St., New York 38, N. Y.)
 Receipts in the salt-water section of the Fulton
 Fish Market by species and by states and provinces for the month indicated.
- Monthly Summary of Fishery Products Production in Selected Areas of Virginia, North Carolina, and Maryland, June 1956, 4 pp. (Market News Service, 18 S. King St., Hampton, Va.) Fishery production for the Virginia areas of Hampton Roads, Lower Northern Neck, and Eastern Shore; the Maryland areas of Crisfield, Cambridge, and Ocean City; and the North Carolina areas of Atlantic, Beaufort, and Morehead City; together with cumulative and comparative data; for the month indicated.
- Gulf Monthly Landings, Production, and Shipments of Fishery Products, June 1956, 5 pp. (Market News Service, U. S. Fish and Wildlife Service, 609-611 Federal Bldg., New Orleans 12, La.) Gulf States shrimp, oyster, finfish, and blue crab landings; crab meat production; LCL express shipments from New Orleans, and wholesale prices of fish and shellfish on the New Orleans French Market; for the month indicated.

- (Chicago) May 1956 Monthly Summary of Chicago's Fresh and Frozen Fishery Products Receipts and Wholesale Prices, 10 pp. (Market News Service, U. S. Fish and Wildlife Service, 565 W. Washington St., Chicago 6, Ill.) Receipts at Chicago by species and by states and provinces; fresh-water fish, shrimp, and frozen fillet wholesale market prices; for the month indicated.
- (Seattle) Monthly Summary Fishery Products, June 1956, 5 pp. (Market News Service, U. S. Fish and Wildlife Service, 421 Bell St. Termial, Seattle 1, Wash.) Includes landings and local receipts as reported by Seattle and Astoria (Oregon) wholesale dealers.
- California Fishery Products Monthly Summary,
 June 1956, 10 pp. (Market News Service, U.S.
 Fish and Wildlife Service, Post Office Bldg.,
 San Pedro, Calif.) California cannery receipts
 of raw tuna and tunalike fish, herring, and
 squid; pack of canned tuna, mackerel, herring,
 anchovies, and squid; market fish receipts at
 San Pedro.

THE FOLLOWING SERVICE PUBLICATION IS FOR SALE AND IS AVAILABLE ONLY FROM THE SUPERINTENDENT OF DOCUMENTS, WASHINGTON 25, D. C.

Raising Bait Fishes, by John Dobie, O. Lloyd Meehean, S. F. Snieszko, and George N. Washburn, Circular 35, 127 pp., illus., printed, 45 cents, 1956. At the second annual meeting of the Tri-State Fisheries Conference (Michigan, Minnesota, and Wisconsin) in 1946, a special committee was appointed to assemble information on bait culture and to assign research to the contributing agencies. In 1948, the results of that cooperative project were published in Circular 12, Propagation of Minnows and Other Bait Species. The present publication is a revision of Circular 12 and adds the results of 5 years of pond investigations by research men in the Midwestern States. It presents information on the culture of bait fishes and is intended as a guide for those interested in commercial propagation of minnows.

MISCELLANEOUS PUBLICATIONS

THESE PUBLICATIONS ARE NOT <u>AVAILABLE FROM THE FISH</u>
AND WILLDIFE SERVICE, BUT USUALLY MAY SEE OSTAINED FROM THE
<u>ORGANIZATION ISSUING THEM</u>. CORRESPONDENCE REGARDING PUBLICATIONS THAT FOLLOW SHOULD BE ADDRESSED TO THE RESPECTIVE ORGANIZATION OR PUBLISHER MENTIONED. DATA ON PRICES, IT READILY AVAILABLE, ARE SHOWN.

"Absorption of Salt by Whole Crays in Cooking," by K. W. Anderson, article, Fisheries Newsletter, vol. 15, no. 5, May 1956, pp. 15, 19, printed. Commonwealth Director of Fisheries, Department of Primary Industry, Canberra, Australia. Experiments, the results of which are given in this paper, were carried out at the C.S.I.R.O. Tasmanian Regional Laboratory at Hobart to obtain quantitative data on the absorption of salt by the meat of crayfish cooked in salt brines. The results show that the tail meat absorbed very little salt even in the concentrated

solutions; meat more than $\frac{3}{8}$ in. below the surface did not absorb salt until the brine strength was increased beyond 10 percent. There was a slight loss of natural salt by leaching on cooking in fresh water, but only from the surface layer. Leg meat absorbed small amounts of salt in brines of low strength and about 1.5 percent in the most concentrated solution.

American Nautical Almanac for the Year 1957,
294 pp., printed, \$2. Nautical Almanac Office,
U. S. Naval Observatory, Washington, D. C.,
1956. (For sale by Superintendent of Documents, Government Printing Office, Washington 25, D. C.) The object of this volume is to
provide in convenient form the astronomical
data required by mariners; that is, the Greenwich hour angle and declination of the celestial
bodies used in navigation.

The Art of the Aqualung, by Robert Gruss, translated by Richard Garnett, 66 pp., illus., printed, \$2.75. Philosophical Library, 15 East 40th St., New York 16, N.Y., 1956. This book is not intended to be a manual for the expert diver, but it gives an outline of the way the aqualung is used in the sea, and of the elementary rules of safety which every diver is obliged to obey. It originally dealt only with diving on the French Riviera, where aqualung diving was born, and where it has been much developed since 1946. It supplies all the information and instruction that the beginner requires to swim and fish and explore, and it will also protect him against the dangers of the game. The translator has added for the English edition some information about British equipment and diving practice.

"Arctic and Sub-Arctic Marine Resources," by John Corlett, article, <u>FAO Fisheries Bulletin</u>, vol. IX, no. 2, April-June 1956, pp. 63-78, printed. Food and Agriculture Organization of the United Nations, Rome, Italy.

Australian Journal of Marine and Freshwater Re-search, vol. 7, no. 1, April 1956, 194 pp., illus., printed, single copy 7s. 6d. (85 U. S. cents). Commonwealth Scientific and Industrial Research Organization, 314 Albert St., East Melbourne, C. 2, Victoria. Includes two ar-ticles on bluefin tuna: (1) "The Southern Bluefin Tuna, <u>Thunnus thynnus maccoyii</u> (Castelnau), in Australian Waters," by D. L. Serventy. This paper deals with the results of the investigations of the Division of Fisheries, C.S.I.R.O., into the biology of the southern bluefin tuna, a representative in southern Australia and New Zealand of the tunny of Europe and the bluefin tuna of California. A comparative description of the morphology of the Australian form is given with a detailed study of its occurrence in Australia, including a discussion of the possible presence of local breeding stocks. The growth rate is considered from a study of lengthfrequency data. Considerable variations have been found in the growth rate of the younger age classes, as well as fluctuations in their relative abundance and their migratory movements along the eastern Australian coastline,

Reference is made to the feeding habits in various areas. (2) "Additional Observations on the Biology of the Northern Bluefin Tuna, Kishinoella tonggol (Bleeker), in Australia," by D. L. Serventy. This paper describes the northern bluefin tuna which occurs along the whole of the north coast of Australia and on the east and west coasts far south as Twofold Bay, N.S.W., and Cockburn Sound, W.A., respectively. Fin formulae, scale row and gill-raker data, and morphometrical characters are recorded separately for fish of the northern, eastern, and western regions. Marked regional differences occur; but it is considered that these can be largely (though not entirely) explained by differential growth of body parts, since only small sizes are found in the extreme north whereas large sizes predominate in the southern portions of the range. The hypothesis of two distinct species, suggested by size group distribution and regional variations, is rejected. Sexual maturity in K. tonggol is reached in the third year of life and spawning is in the summer. The species apparently feeds mainby on pelagic organisms. The Journal also includes the following articles: "The Marine Algae of Kangaroo Island. IV. The Algal Ecology of American River Inlet," by H. B. S. Womersley; "The Ecology and Distribution of Womersley; The Ecology and Distribution of Intertidal Organisms on the Rocky Shores of the Queensland Mainland," by R. Endean, R. Kenny, and W. Stephenson; "A Portable Re-cording Tide Gauge," by E. P. Hodgkin; "The Family Cerithiopsidae (Mollusca) from the Solanderian and Dampierian Zoogeographical Provinces." by C. F. Laseron; and "Addition-Provinces," by C. F. Laseron; and "Addition al Microplankton from Australian Late Mesozoic and Tertiary Sediments," by Isabel C. Cookson.

The Behavior of Pink Grooved Shrimp, PENAEUS DUORARUM Burkenroad, in a Direct Current Electrical Field, by James B. Higman, Technical Series No. 16, 25 pp., illus., printed. State Board of Conservation, Tallahassee, Fla., March 1956. A report of an investigation, undertaken by the Marine Laboratory of the University of Miami on behalf of the Florida State Board of Conservation, to determine whether pink-grooved shrimp could be forced to move involuntarily to the positive pole in a field of pulsed direct current. "If such forced movement of shrimp were possible," states the author, "the 'bad bottom' areas of the west coast of Florida might be opened to commercial shrimping. This area is at present only partially exploited due to widespread coral growths and large sponge beds which restrict trawling. A net designed to fish above these bottom obstructions could be electrified so that shrimp would be diverted into the path of the net. In this manner, areas previously unsuited to trawling would become accessible. Experiments conducted in a tank containing sea water showed that pink-grooved shrimp flipped backward toward the positive electrode when subjected to an electrical field of pulsed direct current. Series of tests were made to determine the optimal electrical conditions that would cause maximum movement to the posi-

tive electrode. Maximum response was 87 percent when these optima were used: (1) a current density of 15 milliamperes per square inch; (2) a pulse rate of 5 per second; and (3) a current ratio of 1:3. (Mathematical treatment of the results indicates that the maximum response would be obtained by using a 1:2 current ratio with the same pulse rate and current density.) Using these optimal values, calculations of the power needed to electrify a 74-foot shrimp trawl showed that the size and the cost of the required electrical generator would be economically impractical. A method of pulsing current by battery or condenser discharge might conceivably reduce the capacity of the generator to a practical size. This problem, however, requires further investigation.

Berichte der Deutschen Wissenschaftlichen Kommission fur Meeresforschung (Reports of German Scientific Commissions for Study of the Ocean), New Sequence, vol. XIV, no. 2, pp. 83-164, illus., printed in German with brief summaries in English. E. Schweizerbart'sche Verlagsbuchhandlung (Nagele u. Obermiller), Stuttgart, Germany, 1956. Contains the following papers: "Die Deutschen Schollenuntersuchungen von 1948-1954" (The German Studies on Flounders, 1948-1954), by Adolf Kotthaus; "Uber das Verhalten des Oberflachensalzgehaltes in der Deutschen Bucht Wahrend der Jahre 1873-1944 in Verbindung mit Langjahrigen Salzgehaltsreihen der Sudlichen Nordsee" (On the Salt Content of the Surface Waters in the German Bay during 1873-1944, compared with the Long Term Series on Salt Content of the Waters in the Southern Part of the North Sea), by Erich Goedecke; and "Uber den Transport von Meroplanktischen Larven aus dem Kattegat in die Kieler Bucht" (On the Transport of the Meroplanktonic Larvae from the Kattegat into the Bay of Kiel), by Karl Banse.

Black Sea Sprat, SPRATTUS SPRATTUS SULINUS
(Antipa), by S. A. Stolanov, Bulletin of the
Academy of Science No. 3, 92 pp., illus.,
printed in Bulgarian, 8LV (US\$1.20). Institute of Zoology, Sofia, Bulgaria, 1953.

Blood Sugar in Spiny Lobsters, Part I of the Hormonal Regulation of Metabolism in Crustaceans, by Bradley T. Scheer and Marlin Ann Ray Scheer, Contribution no. 11, 12 p., illus., printed, (Reprinted from Physiologia Comparate et Occologia, an International Journal of Comparative Physiology and Ecology, vol. II, no. 3, 1951, pp. 198-209.) Department of Zoology and Entomology, University of Hawaii, Honolulu, Hawaii.

Boletim da Pesca, vol. X, no. 51, June 1956, 91 pp., illus., printed in Portugese. Gabinete de Estudos das Pescas, 211 Avenida da Liberdade, Lisbon, Portugal. Contains, among others the following articles: "A Comissao Internacional das Pescarias do Noroeste do Atlantico e a Comparticipacao de Portugal" (The International Northwest Fisheries Commission and Participation of Portugal); "Alguns Problemas da Industria da Pesca de Benguela" (Some Problems of the Fishing Industry of Benguela).

Bulletin of Tokai Regional Fisheries Research
Laboratory (Fisheries Agency), no. 11 (Contribution B), September 1955, illus., printed in Japanese and English. Tokai Regional Fisheries Research Laboratory, Tsukishima, Tokyo, Japan. A collection of reprints covering the following subjects: marine resources; oceanography; marine propagation; fishing gear and methods; chemistry of aquatic products; and utilization of aquatic products, such as food preservation and processing, and fishoils and vitamins.

(Canada) "B. C. Shrimp Fishery," article, Trade News, vol. 8, no. 12, June 1956, pp. 3-4, 11-lus., printed. Department of Fisheries, Ottawa, Canada. Although it is relatively small among British Columbia's fisheries, shrimping is one of the most continuous operations on the Pacific coast. Shrimp fishermen are out, along some part of the coast, every month of the year. There is a steady yield of shrimps in southern B. C. waters, particularly in the Gulf of Georgia and Howe Sound, with a peak period in February and a low one in November. This article describes the type of boat and operation of the gear used in the B. C. shrimp fishery.

(Canada) Regulations Respecting the Construction and Inspection of Fishing Vessels not Exceeding Eighty Feet Registered Length, 38 pp. illus., printed. Queen's Printer and Controller of Stationery, Ottawa, Canada, 1956. These regulations, issued by the Department of Transport, were made pursuant to section 410 of the Canada Shipping Act by Order in Council P. C 1956-150 of January 25th, 1956, and amended by Order in Council P.C. 1956-621 of April 19th, 1956. These regulations may be cited as the small fishing vessel inspection regulations. Part I on fishing vessels exceeding 15 tons, gross tonnage, covers application, submission of plans, bilge pumping arrangements, fuel tanks, exhaust pipes, underwater fittings, stern bearings, rudder stocks, shafting, construction of hulls, life-saving equipment, fire-extinguishing equipment, lights and signals, navigating equipment, anchors and cables, first inspection of new construction, and periodic inspection. Part II on fishing vessels not exceeding 15 tons, gross tonnage, covers application, life-saving equipment, fire-extinguishing equipment, precautions against fire, and periodic inspection. Appendix I shows methods of attaching sea connections to wooden hulls, and Appendix II covers regulations respecting liquefied petroleum gas systems for cooking and heating in ships as applicable to vessels not exceeding 80 feet in length.

(Canada) Summary Statistics of Canada's Fisheries, 1935-1954 (Plus Review of Statistics by Areas for 30 Years, 1925-1954), 32 pp., printed. (Reprinted from Canadian Fisheries Annual, 1956, pp. 65-96.) Department of Fisheries, Ottawa, Canada. Statistics are given for quantities and value of Canadian fishery products by areas for 1934-1948; value of gear and craft; number of fishermen; landings and value of East Coast fisheries and fresh-water

fisheries by provinces and species, and West-Coast fisheries by species; and fresh and frozen fillet production. Imports and exports of fishery products, 1952-1955, by products and countries are given. Also included is a directory of fishery products by type, such as fresh and frozen fish (whole or dressed), fresh and frozen fish (filleted), smoked fish (dressed or filleted), cured fish, canned fish (not including shellfish), shellfish (in shell or meat--not canned), canned shellfish, fish oils and fish livers, fish meal, and other fishery products. Listed under each classification are the companies which process that particular product.

(Canada) Summary Analysis of the Fishing Operations of Small and Medium-Sized Modern Long-Liners and Draggers in the Atlantic Provinces, 1955, by John Proskie, Production Studies vol. 5, part 2, 58 pp., illus., processed. Markets and Economics Service, Department of Fisheries, Ottawa, Canada, May 1956. The results of an analysis of the operating accounts of 136 fishing craft at ports on the Atlantic Coast during the 1955 season are summarized and tabulated. The data are grouped according to type of craft and size-class and give information on (1) description of boats, capital costs, financing ownership; (2) fishing activities; (3) landings and landed values; (4) prices, receipts, expenditures, net returns; (5) fishing effort and returns; (6) geographic operational areas; and (7) seasonal fishing effort and landings. These tables from the 2nd part of vol. 5 of the present series; part 1, a discussion of some of the important points emerging from this study, has not yet been released.

<u>Clupeidae</u>, by A. N. Svetovidov, Fauna of the U.S.S.R. New Series No. 48, vol. II, no. 1, printed in Russian. Zoological Institute of Academy of Science of U.S.S.R., Moscow, Russia, 1952.

Commercial Fishworm Production, by H. S. Swingle, Progress Report Series No. 62, 3 pp., printed. Agricultural Experiment Station, The Alabama Polytechnic Institute, Auburn, Ala., March1956. Discusses the commercial production of fishworms, with instructions on the construction and management of worm beds, preparation of feed mixtures, methods of raising worms, and pests of worm beds.

Complete List of Lights and Other Marine Aids, Atlantic Coast of the United States, vols. 1-6, 927 pp., illus., printed, \$4.75. U. S. Coast Guard, Treasury Department, Washington, D.C., 1956. (For sale by Superintendent of Documents, Government Printing Office, Washington 25, D.C.) Lights and other marine aids to navigation maintained by or under authority of the United States Coast Guard on the Atlantic and Gulf Coasts of the United States, including the United States West Indies. This list is intended to furnish more complete information concerning aids to navigation than can be conveniently shown on charts. They are not intended to be used in navigation in the place of charts and coast pilots and should not be so used. The charts should be consulted for the location of all aids to navigation.

"The Conservation and Future Development of West Marine Resources," by Richard Van Cleve, article, Proceedings of the California Academy of Sciences, Fourth Series, vol. XXVIII, no. 12, pp. 425-439, February 17, 1956, printed. California Academy of Sciences, San Francisco, Calif. (Also Contribution No. 12, University of Washington, School of Fisheries, Seattle, Wash.) According to the author, "Prospects are bright for obtaining a considerable increase in production of fish from the sea but the need for preserving the productive capacity of our currently heavily-exploited stocks must not be forgotten. The combined efforts of fisheries biologists, hydrographers, and marine biologists should result in the development of potentially large oceanic fisheries but considerable technical improvements will be required to enable our fishermen to operate economically on these widely-scattered stocks. On the other hand, the development of adequate markets and more advanced and efficient marketing methods should result in the development of a large fishery along the west coast of North America on stocks which are essentially not now utilized. The best use of this fishing region requires some new means of using many species that cannot now be marketed. full development of our West Coast fisheries it will be necessary to anticipate the need to develop conservation measures along such lines as have been proven so effective by the International Pacific Halibut Commission in their rehabilitation of the north Pacific halibut stocks. The maintenance of our anadromous fish runs will involve the solution of the many problems encountered in handling upstream as well as downstream migrants at dams. Some means will also have to be found to compensate for spawning and rearing areas that will be, or have already been lost by flooding or by closing them to salmon by obstructive dams. Opening new streams by laddering impassable natural barriers and developing more efficient techniques of artificial propagation are both supplementing efforts to preserve the original salmon spawning grounds. Conservation measures similar to those used so effectively by the International Pacific Salmon Fisheries Commission can insure continued productivity of our salmon, provided the fresh-water environment can be preserved. Finally, settlement of the widely divergent views on ownership of deep-sea fisheries must be reached if their development and conservation are to be successfully accomplished. Treaties appear to be the best means devised so far to protect and develop our fisheries through the cooperative effort of interested nations.

De <u>Duitse Zeevisserij</u> (German Sea Fishing), by A. G. U. Hildebrandt with the collaboration of W. H. Th. Gieling, Report No. 215, 76 pp., illus., printed in <u>Dutch</u> with summary in English. Landbouw-Economisch Institut, The Hague, Netherlands, 1954.

Definitions and Methods of Measuring and Counting in the Billfishes (Istiophoridae, xiphiidae), by Luis Rene Rivas, Contribution No. 149, 10 pp., illus., printed. (Reprinted from Bulletin of Marine Science of the Gulf and Caribbean, vol. 6,

- no. 1, March 1956, pp. 18-27.) Marine Laboratory, University of Miami, Coral Gables, Fla.
- A Device for Measuring Fish, by Robert W. Hiatt and Christopher J. Hamre, Research Paper No. 1, 3 pp., illus., printed. (Reprinted from The Journal of Wildlife Management, vol. 9, no. 1, January 1945, pp. 79-81.) Department of Zoology and Entomology, University of Hawaii, Honolulu, Hawaii.
- "The Devilfish," by Robert J. Kemp, Jr., article, <u>Texas Game and Fish</u>, vol. XIV, no. 5, May 1956, pp. 8, 30, illus., printed, single copy 20 cents. State Game and Fish Commission, Walton Bldg., Austin, Texas.
- The Distribution of Eggs and Larvae of the Anchovy, STOLEPHORUS PURPUREUS Fowler, in Kaneohe Bay, Oahu, with a Consideration of the Sampling Problem, by Albert L. Tester, Contribution No. 12, 26 pp., illus., printed. (Reprinted from Pacific Science, vol. V, no. 4, October 1951, pp. 321-346,) Hawaii Marine Laboratory, University of Hawaii, Honolulu, Hawaii.
- "Don't Blacklist Ocean Fish," by Arnold Polonsky, article, The Black Fox Magazine and Modern Mink Breeder, vol. 40, no. 1, May 1956, pp. 9, 21-25, printed, single copy 35 cents. Hoffman Publications, Inc., 425 Fourth Ave., New York 16, N.Y. Discusses the handling, preservation, and utilization of fish for feeding mink. The author gives a few simple rules for utilizing fish in the feeding of mink as follows: "(1) Do not feed one variety of fish in any greater quantity than 15 percent of your ration; (2) Exercise the greatest amount of care in buying only from the best sources. The difference between a good product and a poor product may only represent a 4 of a cent a pound, but that small amount helps the good producer stay interested in the business and making the best product; and (3) When feeding a high fish diet use meat sources that are heavier in fat or even supplement with additional fats such as lard. Carefully consider the varieties of fish that you will use. There are many combinations. Buy one type of fish in a package or block at a time and do your own blending just as you would with horsemeat, liver, lungs, tripe, etc.
- (East Pakistan) Fish Markets of East Pakistan and the Question of their Improvement, by Nazir Ahmad, 16 pp., illus., printed. Directorate of of Fisheries, Government of East Bengal, Dacca, East Bengal, 1956. Describes a survey of the fish markets of East Pakistan, and includes suggestions for their improvement.
- "Effectiveness of Aureomycin on Keeping Quality of Sardine," by T. Tomiyama, M. Nomura and S. Kuroki, article, Bulletin of the Japanese Society of Scientific Fisheries, vol. 21, 1955, pp. 262-266, printed in Japanese with summary in English. Japanese Society of Scientific Fisheries, c/o Tokaiku Suisan Kenkyujo, Tsukishima, Kyobashi, Tokyo, Japan.

- "The Effects of Temperature and Predators on the Abundance of the Soft-Shell Clam, <u>Mya Arenaria</u>, in New England," by John B. Glude, article, <u>Transactions of the American Fisheries Society</u>, 1954, vol. 84, pp. 13-26, printed. American Fisheries Society, Colorado A and M College, Fort Collins, Colo.
- "Exploratory and Experimental Fishing," by S. J. Holt, article, FAO Fisheries Bulletin, vol. IX, no. 1, January-March 1956, pp. 1-22, printed. Food and Agriculture Organization of the United Nations, Rome, Italy.
- The Expressible Fluid of Fish Fillets. IV .-- The Expressible Fluid of Iced Cod, by A. Banks, DSIR Food Investigation Memoir No. 958, 4 pp., printed. (Reprinted from <u>Journal of the Science of Food and Agriculture</u>, vol. 6, no. 10, 1955, pp. 584-587.) Department of Scientific and Industrial Research, Torry Research Station, Aberdeen, Scotland. A number of estimations have been made of the amount and composition of the expressible fluid obtained from gutted cod iced for various periods. The amount of expressible fluid increased rapidly as the fish passed out of rigor mortis and then only slowly for a period, followed by a further fairly rapid increase after 168 hours on ice. It is suggested that the values obtained are associated with the physical changes in texture that occur during the gradual resolution of rigor mortis and with subsequent slight changes in texture and in the colloidal proteins of the protoplasm. The amount of expressible fluid obtained does not appear to be related to the size of the fillets.
- "Fertile Oysters May Bring New Industry," article, South Carolina Wildlife, vol. 3, no. 2, Spring Issue 1956, pp. 11, 15, illus., printed. South Carolina Wildlife Resources Department, Columbia, S. C. Discusses the fertility of the South Carolina oysters, the threats to the oyster industry in that area, and the studies being conducted for the proper development of the oyster industry.
- Fertilizers in Fish Ponds, by C. H. Mortimer, Fishery Publication No. 5, 155 pp., illus., printed, 25s. (US\$3.50). H. M. Stationery Office, York House, Kingsway, London, W.C. 2, England, 1954.
- Fish Cookery, by Linnea C. Dennett, Circular 403, 12 pp., illus., printed. Agricultural Extension Service, College of Agriculture, University of Wisconsin, Madison, Wis., revised November 1955. Includes instructions for buying fresh fish; methods of cleaning, skinning, boning, and storing fish, and thawing frozen fish; and various recipes for cooking fish and shellfish.
- "The Fisheries of Antarctica," by G. C. L. Bertram and J. D. M. Blyth, article, <u>FAO Fish-</u> eries Bulletin, vol. IX, no. 2, April-June 1956, pp. 79-84, illus., printed, single copy 30 cents. Food and Agriculture Organization of the United Nations, Rome, Italy. (Also for sale by

Columbia University Press, International Documents Service, 2960 Broadway, New York 27, N. Y.)

- "Fish, Fisheries and Environmental Factors," by J. N. Carruthers, article, Oceanus, vol. IV, no. 2, Winter 1956, pp. 14-20, illus., printed. Woods Hole Oceanographic Institution, Woods Hole, Mass. Some of the author's views in regard to the climatic and oceanographic factors influencing the environment of fish. According to the author, "Fish catches may be predicted through a knowledge of wind conditions during and after spawning."
- Fisheries Newsletter, vol. 15, no. 2, February 1956, 24 pp., illus., printed. Commonwealth Fisheries Office, Dept. of Primary Industry, Canberra, Australia. The entire issue of this Newsletter is devoted to articles on shrimp (prawns), covering the biology, technology, and economics of the industry: "Australian Prawns-Identification and Biology," by W. Dall; "Australian Prawns--The Gear that Takes Them," by A. O'Grady; "Australian Prawns--The Broad View on Exports," by F. J. Kearns; and "Shrimp Big Industry in U. S. A." The latter paper is an account of the United States shrimp industry based mainly on "Marketing and Utilization of Shrimp in the United States," a paper prepared for the Indo-Pacific Fisheries Council meeting in Tokyo by Don M. Clifford of the U. S. Fish and Wildlife Service.
- Fish Handling and Hold Construction in Canadian North Atlantic Trawlers, by W. A. MacCallum, Bulletin No. 103, 66 pp., illus., printed. Fish-eries Research Board of Canada, Ottawa, Canada, 1955. This bulletin is concerned mainly with the handling of the catch aboard trawlers fishing North Atlantic groundfish, principally cod, haddock, and flatfish. The quality of the landed fish is influenced by the methods of handling the catch on deck and in the fish hold and the conditions of stowage. No subsequent steps in the processing chain can improve upon this landed quality. This bulletin is intended to assist fishermen, boat owners, operators, and processors to understand the nature of the complex problem of preservation at sea, to demonstrate proper methods of handling, and to des-cribe fish-hold construction suited for the iced stowage of their catches. The various chapters discuss spoilage and its control aboardship; ice and refrigeration requirements in trawler fish holds; the development of metal-surfaced, wholly refrigerated fish holds; good practice in fish-hold construction, outfitting, and refrigeration; and fish-room costs.
- Fisken og Havet ved Gronland (Fish and the Sea of Greenland), by P. M. Hansen and F. Hermann, Skrifter fra Danmarks Fiskeri-og Havunder Sogelser (Papers of the Danish Fishery and Sea Investigations), No. 15, 128 pp., illus., printed in Danish. 1 Kommission Hos, Copenhagen, Denmark, 1953.
- The Ft. Myers, Florida, Fisheries School of the Marine Laboratory of the University of Miami, by Jack Brawner and C. P. Idyll, 4 pp., proc-

- essed. Marine Laboratory, University of Miami, Coral Gables, Fla. For several years the Marine Laboratory of the University of Miami has sought means of establishing fishery schools in Florida. With the hope that funds would eventually become available, and because of the widespread interest by the industry, it was decided to establish a "pilot" school in Florida in the belief that the experience gained would be of benefit not only to Florida, but other states as well, when a regular program of fishery education became a reality. Ft. Myers was chosen for the first school and it was established on March 1, 1956. This leaflet describes the initial organization of the fishery school, its activities, and objectives. The objectives may be listed as follows: (1) to arouse the interest of boys in the skilled and honorable trade of commercial fishing; (2) to arouse the interest of able students in the professional fisheries field, which, like most technical professions lacks a sufficient number of trained men; and (3) to draw attention to the fisheries industry, and to strengthen it by promoting the production of high-quality fishery products, which will lead to increased sales and prosperity in this important phase of our economy.
- "Freezing in Alginate Jelly," by Alf Olsen, article, Norwegian Fishing News, vol. 3, no. 3, 1956, pp. 7-8, printed. Norwegian Fishing News, tol. 3, no. 4, 1956, pp. 7-8, printed. Norwegian Fishing News, Ltd., Bergen, Norway. Describes the method of using alginate jelly in the freezing of herring for bait and in the freezing of sardines, shrimp, and small fish. Tests indicate that this method has the following advantages:

 (1) rancidity is prevented; (2) the fish will not dry up; (3) since the jelly thaws before the fish, the fish can easily be separated without damage; (4) the salts which are added do not migrate, so avoiding a concentration of salts on the surface of the fish; (5) the jelly setting time can be regulated; (6) the freezing time is considerably reduced; (7) the unpleasant smell, so noticeable when frying herring, almost disappears; and (8) when stored in jelly for a period, herring becomes milder in taste.
- General Agreement on Tariffs and Trade--Analysis of United States Negotiations--Sixth Protocol (Including Schedules) of Supplementary Concessions, Department of State Publication 6348, Commercial Policy Series 158, 310 pp., processed, \$1. Department of State, Washington, D. C., June 1956. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.)
- General Agreement on Tariffs and Trade (Messsage from The President of the United State Transmitting the Sixth Protocol of Supplementary Concessions to the General Agreement on Tariffs and Trade, Pursuant to Section 4 of the Trade Agreements Extension Act of 1951, as Amended), House Document No. 421, 541 pp., processed. United States Government Printing Office, Washington 25, D. C., 1956.
- General Agreement on Tariffs and Trade, Schedule XX, United States of America (Annotated

to Show Countries With Which Concessions Were Initially Negotiated at Geneva in 1956), Department of State Publication 6362, Commercial Policy Series 159, 127pp., processed, 60 cents. Department of State, Washington, D.C. (For sale by the Superintendent of Documents, Government Printing Office, Washington 25, D.C.)

- How to Produce and Sell Smoked Florida Mullet, by Jack Brawner and Phillip A'Brams, Educational Series No. 8, 16 pp., illus., printed. State Board of Conservation, Tallahassee, Fla., June 1956. The Florida mullet industry is presently in a depressed condition, which is partly the result of a trend towards consumption of packaged fishery products. This report is published primarily for the benefit of small wholesalers and retailers, in an effort to alleviate depressed conditions due to the decline in the demand for fresh fishery products. Detailed instructions are given for building a smokehouse capable of producing up to about 2,000 pounds per week. This smokehouse can be produced cheaply, probably costing less than \$100, excluding labor. Instructions are given for smoking mullet, emphasizing the procedures necessary to produce a good product. Potential market outlets for mullet include supermarkets, small grocery stores, retail fish markets, wholesale fish dealers, vegetable truck routes, fish truck routes, delicatessen stores, restaurants, road-side stands, and bars.
- "India--Proclamation of the President of India (Sovereign Right over Continental Sheif)" XVI.2/55.1), Food and Agricultural Legislation, vol. IV, no. 3, 1955, 1 p., printed, single copy \$1. Columbia University Press, International Documents Service, 2960 Broadway, New York 27, N. Y.
- Informaciones Estadisticas sobre Pesca, Anos 1953-1954 (Statistical Information on Fisheries, 1953-1954), 60 pp., illus., processed in Spanish. Direccion General de Pesca y Caza, Valparaiso, Chile.
- Inter-American Specialized Conference on "Conservation of Natural Resources: The Continental Shelf and Marine Waters" (Ciudad Trujillo, March 15-28, 1956), Final Act, Conferences and Organizations Series No. 50, 46 pp., processed, 50¢. Division of Conferences and Organizations, Department of International Law, Pan American Union, Washington, D. C., 1956. The Inter-American Specialized Conference held in Ciudad Trujillo on March 15-28, 1956, was convoked for the purpose of studying as a whole the different aspects of the juridical and economic system governing the submarine shelf, oceanic waters, and their natural resources in the light of present-day scientific knowledge. The resolutions of the Conference are included as well as statements of the delegations from Brazil; Mexico; Costa Rica, Chile, Ecuador, and Peru; Guatemala; El Salvador; Colombia; United States; Cuba; Panama; Uruguay; and Venezuela.
- (International Pacific Salmon Fisheries Commission) Annual Report 1955, 41 pp., illus., print-

- ed. International Pacific Salmon Fisheries Commission, New Westminster, Canada, 1956. A report of the Commission, an international agency appointed under a convention between Canada and the United States for the protection, preservation, and extension of the sockeye salmon fisheries in the Fraser River system. Discussed in this report are the various activities of the Commission during 1955; the regulations, the United States fishery, the Canadian fishery, Indian catch statistics, escapement, the 1956 cycle, rehabilitation of barren areas, watershed protection, and general investigations.
- Irish Moss (In the Maritime Provinces), by Constance I. MacFarlane, 20 pp., illus., printed. Nova Scotia Research Foundation, P. O. Box 1027, Halifax, Nova Scotia, 1956. This bulletin is in part a revision of the Fisheries Research Board Atlantic Biological Station Circular No. 10, by A. W. H. Needler (1947) and contains material and excerpts from that paper. It is intended to assist those who may wish to identify Irish moss, to find it, and to dry itfor marketing. Numerous problems relating to seaweeds are yet unsolved and many questions remain unanswered in this bulletin. Revision will be necessary from time to time as results become known from further research. The seaweed industry has undergone a series of changes. From being used as a source of potash and iodine in the 18th and 19th centuries, seaweeds have now become a source of extracts though the seaweeds themselves are often used as food or fertilizers. New uses for the extract are constantly being sought. The dairy industry is a large consumer; the baking, confectionery, and pharmaceutical industries also use considerable amounts, as well as the brewing, leather, and paint industries. For most purposes Irish moss extract must compete with other substances, such as various plant gums, synthetic adhesives, and starch. The resulting competitive price makes it necessary for a harvester to gather several hundred pounds per day. An experienced harvester with good equipment can sometimes harvest a thousand pounds at a tide.
- "Is Feeding Fish Dangerous?" by A. B. DeHaan, article, The Black Fox Magazine and Modern Mink Breeder, vol. 39, no. 11, March 1956, pp. 13, 26-29, printed, single copy 35 cents. Hoffman Publications, Inc., 425 Fourth Ave., New York 16, N. Y. The author, a well-known mink breeder, discusses some of his problems and experiences in using fish in mink diets.
- Ist Baktericides Eis zum Vereisen Frischer Seefische auf den Fishchdampfern Erwtinscht oder Überhaupt Zulassig? (Is Bactericidal Ice for the Icing of Fresh Sea Fish on Board Fishing Vessels Desirable or a tall Admissible?), by T. Seeler, article, Deutsche Lebensmittel Rundschau, 51, 1955, pp. 133-135, printed. Tubinger, S. Strasse 53, Stuttgart, Germany.
- Kalamiesten Niksikirja (A Book of Fishermen's Tricks), by E. Halme, 395 pp., illus., print-

ed in Finnish. Soderstrom Osakeyhtio, Porvoo, Helsinki, Finland, 1955.

- "The Lake Sturgeon," by John Van Oosten, article, <u>Texas Game and Fish</u>, vol. XIV, no. 5, May 1956, pp. 12, 25, illus., printed, single copy 20 cents. State Game and Fish Commission, Walton Bldg., Austin, Tex.
- "The Lake Trout Endangered in the Great Lakes," by James W. Moffett, article, <u>Our Endangered</u> <u>Wildlife</u>, pp. 23-24, printed. National Wildlife Federation, 232 Carroll St. NW., Washington 12. D. C.
- Laws Concerning the Nationality of Ships, Doc. ST/LEG/SER.B/5, 200 pp., printed, \$1.50. United Nations Department of Public Information, Press and Publications Division, United Nations, N. Y.

This book was prepared by the Codification Division of the UN Office of Legal Affairs, primarily for the use of the International LawCommission in its continuing comprehensive study of the regime of the high seas.

The Commission has been engaged upon the task of codifying the law of the high seas and of territorial waters ever since its first session in 1949.

No attempt is made in the new volume to present conclusions, or to classify the information contained, most of which was furnished by governments at the request of Secretary-General Dag Hammarskjold. In cases where governmental information was not available, other sources were consulted. Most of the texts are in English, but a few, which were submitted in French, are presented in that language.

In a brief introduction, the Codification Division notes that there is "no uniformity" in the conditions on which states allow merchant ships to fly their flags. It goes on, however, to quote an earlier report on the regime of the high seas by J. P. A. Francois, noted Netherlands legal authority and a member of the International Law Commission, who said: "The acknowledged freedom of a State to lay down the conditions on which it shall grant its nationality to ships is, of necessity, based on the concept that the national element with regard to a ship and the manner in which it is used have a wide variety of application, and that a certain minimum should be guaranteed in the general interest of all who use the high seas."

- A Measured Delay in the Migration of Adult Chinook Salmon at Bonneville Dam on the Columbia River, by Robert W. Schoning and Donald
 R. Johnson, Contribution No. 23, 17 pp., illus.,
 printed. Fish Commission Research Laboratory, Route 1, Box 31A, Clackamas, Oreg.,
 May 1956.
- Methods of Exterminating Wild Fish in Ponds, by S. Sarig, Bamidgeh, Bulletin of Fish Culture in Israel, vol. 6, no. 1, printed in English and

- Hebrew. Department of Fisheries, Ministry of Agriculture, Agricultural Publications Section, P. O. Beit-Shean, Israel, 1954.
- Modern Marine Engineering, by D. W. Rusdorff, 154 pp., illus., printed, \$4,75. Philosophical Library, 15 East 40th St., New York 16, N. Y. A concise review of the various types of propulsion plants now in use in vessels for different services.
- Modern Naval Architecture, by W. Muckle, 154 pp., illus., printed, \$4.75. Philosophical Library, 15 East 40th St., New York 16, N.Y. Gives an account of the various problems the naval architect must solve.
- Nord- og Sor-Norsk Naeringsliv, 1955-1956Fiskeindustri--Fiskerier--Produksjon og Handel (North- and South-Norwegian Industries, 1955-1956--Fish Processing Industry--Fishereires--Production and Commerce), 354 pp., illus., printed in Norwegian and English. Halvorsen & Larsen A/s, Trondhjemsvn. 72, Oslo, Norway. Includes the following articles with English translations: "Territorial Limits and Fishery Protection," by C. J. Hambro (in English only); "The Organization of the Fisheries Administration in Norway." by Johs. Sellaeg; "International Agreements for the Protection of Fish Stocks." by Johs. Sellaeg; "The Norwegian Fisheries," by Johs. Sellaeg; "The Norwegian Fisheries," by Johs. Sellaeg (in English only); "Norwegian Fish Exports-General Survey," by Per Rogstad; "Sales Organizations in the Norwegian Fisheries Industry," by Per Rogstad; "Exports of Herring and Herring Products," by Magne Oppedal; "The Export of Fresh and Frozen Fish (Other than Herring), Stockfish, Klipfish and By-products," by Carl Bjorge; "The Norwegian Herring Oil and Herring Meal Industry," by M. Midsem; "Herrigeration Plants in the Norwegian Fisheries Industry," by M. Midsem; "The Relief Service for the Sealers in the Western Ice," by Birger Rasmussen; and "The Result of the Sealing for 1954." Other articles on fisheries, in Norwegian only, are also included.
- Norges Matnyttige Fisk (Norwegian Edible Fish), by H. Tambs-Lyche, Fiskeridirectoratets Skrifter, Ser. Fiskkeri, vol. 3, no. 4, 132 pp., printed in Norwegian. Director of Fisheries, Bergen, Norway, 1955. Gives a very good summary of present knowledge of commercial fishes in northern waters. For nearly every important fish the following descriptions and data are given: (1) Norwegian catches from various waters and the comparative values from several other countries; (2) geographical distribution of the species and various stocks; (3) summary on the studies of the biology and ecology of the species; and (4) life history. This book is very useful for fisheries education and as a hand-book for the scientists in related fields (e.g., the hydrographer).
- "Norway--Regulations Relating to the Protection of Brisling and to the Canning of Brisling and Small Herring," XVI.5/55.1, Food and Agricultural Legislation, vol. IV, no. 3, 1955, 5 pp., printed, single copy \$1. Columbia Uni-

- versity Press, International Documents Service, 2960 Broadway, New York 27, N. Y.
- "Norway--Regulations Relating to the Handling, Processing and Transport of Fish to be Converted into Salted Fish, Klipfisk and Stockfish," XVII. 2/55.1, Food and Agricultural Legislation, vol. IV, no. 3, 1955, 11 pp., printed, single copy \$1. Columbia University Press, International Documents Service, 2960 Broadway, New York 27, N. Y.
- "Observations on the Shoaling Behaviour of Cod (Gadus callarias) in Deep Water Relative to Daylight," by G. H. Ellis, article, Journal of the Marine Biological Association of the United Kingdom, vol. 35, no. 2, 1956, pp. 415-417, illus., printed. Cambridge University Press, 32 East 57th St., New York 22, N. Y. During a commercial fishing voyage to the Barents Sea continuous observations were made on the shoaling behavior of cod in deep water over a period of 19 hours. The cod were studied by the use of a Kelvin and Hughes MS. 24J recording echo-sounder. Compact cod shoals recorded in 100-fm. during daylight dispersed at sunset and re-formed at sunrise. The maximum possible vertical movement of the fish during observation was 30 fm. The catches did not vary significantly with the formation of the cod.
- The Occurrence and Taxonomic Relationships of the Blue Marlin (MAKAIRA AMPLA Poey) in the Pacific Ocean, by Luis Rene Rivas, Contribution No. 153, 15 pp., illus., printed. (Reprinted from Bulletin of Marine Science of the Gulf and Caribbean, vol. 6, no. 1, March 1956, pp. 59-73.) Marine Laboratory, University of Miami, Coral Gables, Fla.
- Opbevaring af Levende Hummer (Storage of Live Lobster), by F. Bramsnaes and Jan Boetius, 16 pp., illus., printed in Danish with summary in English. (Reprinted from Meddelelse fra Fiskeriministeriets Forségslaboratorium, Nov. 1953) Fiskeriministeriets, Borgergade 16, Copenhagen, Denmark.
- (Oregon) Fisheries Statistics of Oregon, 1950-1953, Contribution No. 22, 33 pp., printed. Fish Commission of Oregon, Portland, Oregon, February 1956. This statistical bulletin provides a ready source of information concerning the productivity of the marine and river commercial fisheries of the State of Oregon for 1950-1953. These fisheries data are given in pounds by species, rivers, and months.
- A Pattern of Coastal Circulation Inferred from Synoptic Salinity Data, by Ilmo Hela, Contribution No. 154, 10 pp., illus., printed. (Reprinted from Bulletin of Marine Science of the Gulf and Caribbean, vol. 6, no. 1, March 1956, pp. 74-83.) Marine Laboratory, University of Miami, Coral Gables, Fla.
- La Pesca en Espana, I. Cataluna (Fisheries of Spain. I. Catalonia), by C. Bas, E. Morales, and M. Rubio, 468 pp., illus., printed in Spanish. Instituto de Investigacione Pesqueras,

- Barcelona, Spain, 1955. The first of a series, this publication covers: physical conditions of fisheries; fishing boats and gear; marine productivity; the fishery; ports and fishing beaches; economics; and present-day fisheries
- Pesca y Caza (Fishing and Hunting), no. 7, 100 pp., illus., processed in Spanish. Ministerio de Agricultura, Direccion de Pesqueria y Caza, Lima, Peru, 1956. Includes, among others, articles on Peru's fisheries and data for 1953, some new fish species, shellfish, and a description of some of Peru's more common species.
- Plants and Animals of the Sea-Shore, by W. J. Prud'Homme van Reine, translated from the Dutch and adapted for the coasts of Britain in collaboration with Mona C. Harrison, 144 pp., illus., printed. John Murray, Albemarle Street, W., London, England, 1955. A handy guide containing drawings and descriptions of over 450 species of fish, shellfish, seaweeds, birds, etc.
- Practical Marine Engineering, by Reno C. King, Jr., 2nd edition, 541 pp., illus., printed, \$7.35. Prentice Hall, 70 5th Ave., New York 11, N. Y. Outgrowth of lectures given to applicants for Merchant Marine Engineering Officer licenses.
- "The Pygmy Whitefish, <u>Coregonus coulteri</u>, in Lake Superior," by Paul H. Eschmeyer and Reeve M. Bailey, article, <u>Transactions of the American Fisheries Society</u>, 1954, vol. 84, pp. 164-199, printed. American Fisheries Society, Colorado A and M College, Fort Collins, Colo.
- Recent Developments in the Freezing of Fish at Sea. II. -- The Quality of Sea-Frozen Cod, by A. Banks, DSIR Food Investigation Memoir No. 965, 3 pp., printed. (Reprinted from Chemistry and Industry, 1955, pp. 1360-1362.)
 Department of Scientific and Industrial Research, Torry Research Station, Aberdeen, Scotland. Discusses investigations on the quality of fish treated in different ways before freezing and cold storage. These investigations have shown that the fish should be gutted and well iced very soon after catching; that they should not be held for longer than three days in ice before freezing, and that the fro-zen products should be cold-stored at -28° to -30° C. Treated in this way, the products on thawing should prove highly acceptable, and a properly arranged scheme of freezing at sea based on these principles should do much to improve the over-all quality of fish caught on distant fishing grounds.
- Relation of Chemical Structure to Irritant Responses in Marine Fish, by Robert W. Hiatt, John J. Naughton, and Donald C. Matthews, Contribution No. 36, 6 pp., printed. (Reprinted from Nature, vol. 172, November 14, 1953, p. 904.) Hawaii Marine Laboratory, University of Hawaii, Honolulu, Hawaii.

- "Report on the Distribution and Abundance of Pacific Herring (Clupea pallasi) along the Coast of Central and Southern California, "by Daniel J. Miller and John Schmidtke, article, California Fish and Game, vol. 42, no. 3, July 1956, pp. 163-187, illus., printed. Department of Fish and Game, 926 J St., Sacramento 14, Calif.
- Report on Research from the ERNEST HOLT into the Fishery near Bear Island, 1949 and 1950, by M. Graham, G. C. Trout, R. J. H. Beverton, J. Corlett, A. J. Lee, and R. W. Blacker, Fishery Investigations Series II, vol. XVIII, no. 3, 87 pp., illus, printed, 12s. 6d. (US\$1.75). H. M. Stationery Office, York House, Kingsway, London, W. C. 2, England, 1954.
- "The Reproduction of Lake Trout in Southern Lake Superior," by Paul H. Eschmeyer, article, Transactions of the American Fisheries Society, 1954, vol. 84, pp. 47-74, printed. American Fisheries Society, Colorado A and M College, Fort Collins, Colo.
- Research Briefs, vol. 6, no. 2, December 1955,
 41 pp., illus., printed. Fish Commission Research Laboratory, Route 1, Box 31A, Clackamas, Oreg. Includes the following articles:
 (1) "Size Composition, Growth, and Seasonal Abundance of Juvenile English Sole (Parophrys vetulus) in Yaquina Bay," by Sigurd J. Westrheim; (2) "Fifth Progress Report on Salmon Diet Experiments," by Wallace F. Hublou, Thomas B. McKee, Ernest R. Jeffries, Russell O. Sinnhuber, and Duncan K. Law; (3) "A Survey of the Bull Kelp Resources of the Oregon Coast in 1954," by Kenneth D. Waldron; (4) Escapement of Spring Chinook Salmon and Steelhead Over Willamette Falls in 1954," by Earl F. Pulford; (5) "River Recoveries of Marked Silver Salmon of the 1949 Brood Released from the Nehalem River Hatchery," by Kenneth A. Henry; and (6) "Kidney Disease in Adult Chinook Salmon and Its Transmission by Feeding to Young Chinook Salmon," by James W. Wood and Joe Wallis.
- The Scientific Name of the Nehu, and Engraulid Baitfish of the Hawaiian Islands, by William A. Gosline, Contribution No. 5, 1 p., printed. (Reprinted from Pacific Science, vol. V, no. 3, July 1951, p. 272.) Hawaii Marine Laboratory, University of Hawaii, Honolulu, Hawaii.
- Sea Moss (CHONDRUS CRISPUS), Survey Pemaquid Foint to Owls Head, by Walter S. Foster,
 General Bulletin No. 5, 8 pp., illus., printed.
 Department of Sea and Shore Fisheries, Vickery-Hill Bidg., Augusta, Me., December 1955,
 In surveying the sea moss, Chondrus crispus,
 an attempt has been made to determine the amount of moss an average moss raker could
 gather from the ledges and islands from Pemaquid Point to Owls Head. Includes maps of the
 regions surveyed showing density of moss and
 a code used to express in general terms the prevailing sea moss raking and growing conditions
 of the particular areas indicated on the maps.

- The Selective Action of Gill Nets on Fraser River Sockeye Salmon, by Alvin E. Peterson, Bulletin 5, 101 pp., illus., printed. International Pacific Salmon Fisheries Commission, New Westminster, B. C., Canada, 1954.
- Ship and Boat Builder Annual Review, 1955, 382 pp., illus., printed, 30s. (US\$4.20). John Trundell Ltd., Temple Chambers, Temple Ave., London, E. C. 4, England.
- "Snapping Turtle (<u>Chelydra serpentina</u>)," by George J. Knudsen, article, <u>Wisconsin Con-</u> <u>servation Bulletin</u>, vol. 21, no. 5, May 1956, pp. 36-37, illus., printed. Wisconsin Conservation Dept., Madison 1, Wis. A brief description of Wisconsin's snapping turtle and its habits.
- Some Aspects of the Schooling Behaviour of Fish, by Miles H. A. Keenleyside, 66 pp., illus., printed. (Reprinted from Behaviour, vol. VIII, 2-3, pp. 183-248.) E. J. Brill, Leiden, Netherlands, 1955.
- The South African Fishing Industry Handbook and Buyers' Guide, 1956, 245 pp., illus., printed, L2 2s. (US\$5.90). South African Shipping News and Fishing Industry Review, Box 2598, Cape Town, South Africa, 1956. This is the third edition of a handbook designed to acquaint readers with the various aspects of the South African fishing industry. The book is divided into several sections. "Marine Resources of South Africa" discusses South Africa's place in the world's fish trade, the processing factories, the trawling industry, the rock lobster industry, fishing in South-West Africa, and South African fish species. The list of species in this section gives the English, Afrikaans, and Scientific name for each species caught in South Africa. In the section "Organizations Serving the Industry," the following are described: The Division of Fisheries, the Fishing Industry Research Institute, the Fisheries Development Corporation, Weskus-Vissersvereniging (West Coast Fishermen's Association), the South African Bureau of Standards, the Food and Agriculture Organization, as well as a description of the control of fisheries in South-West Africa, fishing harbors in South Africa, and inshore fishing industry organizations. Brief biographical notes on the leading personalities professionally connected with the industry are to be found in the section "Who's Who in the Fishing Industry." "Guide to Companies in the Fishing Industry" is a section which lists the names, functions, addresses, factories, capital, directors, and affiliations of companies operating in South and South-West Africa. A classified list of fish products with brand and producers' names is contained in the section "Products of the Fishing Industry." "Suppliers to the Fishing Industry--Buyers' Guide" is a classified list of products offered to the fishing industry. Details on South African motor fishing boats, motor trawlers, and steam trawlers, and South-West African boats, and other miscellaneous craft are given in the

section "Fishing Craft Operating in South and South-West Africa." The last section--"Marine Engines"--is a detailed list of engines offered for installation in South and South-West African fishing boats.

- "Status of Sea Lamprey Control," by James W.
 Moffett, article, Wisconsin Conservation Bulletin, vol. 21, no. 4, April 1956, pp. 14-17,
 illus., printed. Wisconsin Conservation Dept.,
 State Office Bldg., Madison 1, Wis. This article reports progress in the application of sealamprey control measures. According to the
 author, "The lamprey is likely to cause further
 damage before it is controlled. Electromechanical weirs can solve the problem slowly. Selective poisons are promising but largely unproved and unavailable in quantity."
- Studies on the Question of Salmon "Economy" in the Far East, 207 pp., illus., printed in Russian. Akademija Nauk SSSR, Ihtiologitseskaja Komissija, Moscow, Russia, 1954. Discusses the biological, economical and fisheries technological problems of Pacific salmons off the Russian Pacific coast.
- Theoretical Yields at Various Rates of Natural and Fishing Mortality in Stabilized Fisheries, by Albert L. Tester, Contribution No. 30, 8 pp., illus., printed. (Reprinted from Transactions of the American Fisheries Society, vol. 82, 1952, pp. 115-122.) Marine Laboratory, University of Hawaii, Honolulu, Hawaii, 1953. This paper presents a series of curves depicting the yields for fisheries stabilized at various rates of natural and fishing mortality, for each of three types of S-shaped growth curve: Type A, point of inflection acrly in life; Type B, point of inflection late in life; and Type C, point of inflection late in life.
- A Triple Frequency Echo Sounder, by D. H. Cushing and I. D. Richardson, Ministry of Agriculture, Fisheries and Food Fishery Investigations, Series II, vol. XX, no. 1, 20 pp., illus, printed, 3s. (40 U.S. cents). Her Majesty's Stationery Office, London, England, 1955. In experiments with dead fish hung from below an echo sounder significant differences between signals returned from cod and herring were found, using any one frequency; it was further found that a lower frequency would be best for cod and a higher frequency best for herring. This required testing on fish shoals in the sea, partly because in the experimental work some part of the echo received might have been due to the frame and partly because the arrangement of the dead fish in a shoal was an artificial one. Another subject for investigation was that of the variability in signal amplitude, which might well be proportional to the number of fish per unit volume. In order that these two points might be investigated, a triple frequency echo sounder was designed and used in the investigations described in this paper.
- "Two Obscure Oyster Enemies in New England Waters," by V. L. Loosanoff, article, Science, vol. 123, no. 3208, June 22, 1956, pp. 1119-

- 1120, printed, single copy 25 cents. American Association for the Advancement of Science, Business Press, Lancaster, Pa. Describes two forms of oyster enemies recently observed in New England waters which may be responsible for several "mysterious" mortalities of oysters, especially the young. One of these enemies is a flatworm, the polyclad (Stylochus ellipticus), and the other is a small gastropod (Menestho bisuturalis).
- <u>Uber die Verwendung von Bactericiden Zusatzen</u>
 <u>beim Waschen von Frischfisch</u> (The Use of
 Bactericidal Additives in the Washing of Fresh
 Fish), by W. Partmann, article, <u>Kaltetechnik</u>,
 7, 1955, pp. 270-275, printed. <u>Kaltetechnik</u>,
 Lamnnstrasse 2-4, Karlsruhe, Germany.
- (Uganda) Annual Report of the Game and Fisheries Department (For the Period 1st January, 1954, to 30th June, 1955), 143 pp., illus., printed, 6s. (84 U.S. cents). Government Printer, P. O. Box 33, Entebbe, Uganda, 1956. Includes a section on the fisheries of Uganda by regions: Lake Albert; Lakes George/Edward; and Lake Kyoga. Development in the fisheries has been rapid in some directions and steady in others. Fish production has been stepped up, new fisheries opened, dams and lakes stocked, improved equipment and methods introduced, and marketing facilitated. New craft have been demonstrated and training in boat building introduced, while a start has been made in stocking trout in the rivers of Mt. Elgon, Ruwenzori, and north Acholi. Fish farming is developing with rapidly increasing momentum and the Department's experimental and demonstration fish farm at Kajansi, which only two years ago was a block of dense tropical rain forest, already covers 20 acres of specially-constructed fry and production ponds, feeder furrows, and auxiliary buildings. Statistics are given for the 1954 catch of fishery products by months and species for Lake George and by species for Lake Edward and Kazinga Channel, as well as quantities and values of salted and smoked fish exports in 1954. Other sections of the report deal with game,
- "An Undescribed Type of Migration in King Salmon, Oncorhynchus tshawytscha (Walbaum), "by Howard McCully, article, California Fish and Game, vol. 42, no. 3, July 1956, pp. 189-198, illus., printed. Department of Fish and Game, 926 J St., Sacramento 14, Calif.
- The Use of Chemical Additives in Food Processing (A Report by the Food Protection Committee of the Food and Nutrition Board), Publication 398, 97 pp., printed, \$2. National Academy of Sciences-National Research Council, Washington 25, D.C., February 1956. The Food Protection Committee of the National Research Council has undertaken a study of the use of chemicals in foods for the purpose of evaluating the technological benefits arising from such use and of appraising the significance of associated public health problems. This report deals only with a survey of the extent of use and technological benefits of use of inten-

tional chemical additives, including transient chemicals and naturally-occurring substances used as additives.

Various Species of Cod, by A. N. Svetovidov, Fauna of the U.S. S.R. New Series No. 34, vol. IX, no. 4, printed in Russian. Zoological Institute of Academy of Science of U.S. S. R., Moscow, Russia, 1948.

(Virginia) Laws of Virginia Relating to Fisheries of Tidal Waters, 1936 Cumulative Supplement, 20 pp., printed. (Reprinted from the 1956 Cumulative Supplement to the Code of Virginia of 1950.) Commission of Fisheries of Virginia, Newport News, Va., 1956.

"Walrus Hunt," by Edward Weyer, Jr., article, Natural History, vol. LXV, no. 1, January 1956, pp. 28-32; illus., printed, single copy 50 cents. American Museum of Natural History, New York 24, N.Y. Describes the annual walrus hunt of the Iglulik Eskimos which is one of the most hazardous pursuits in the arctic. The walrus hunt illustrates how vital and indispensable a weapon the harpoon is to any people who lives by sea hunting. This implement has permitted the survival of tribes in regions otherwise uninhabitable. This article describes the hunting techniques, the many hazards encountered, and the task of landing a walrus.

Washington Department of Fisheries, 64th Annual Report, 63 pp., illus., printed. Washington State Department of Fisheries, Seattle, Wash., May 1956. This report discusses the activities and objectives of the Department of Fisheries for the year 1954. Many details of the technical investigations have been omitted, since these results are now published in two new series of research papers and bulletins. Much statistical data has been published previously and also is mentioned only briefly; on the other hand,

greater emphasis has been placed on pictorial reporting. As another departure, an independent report has been selected for the introductory chapter—the report and recommendation of the Washington Legislative Interim Fisheries Committee to the 1955 Legislature. It reflects close contact with the problems and developments, fishery-wise, of the years since 1951 and with program needs for the years ahead. In addition, the report contains information on the big sockeye run of 1954, hatchery research and operations, stream and marine research, fishways and stream improvements, shellfish research, power dam and fish research, pollution research, fisheries patrol, and 1954 fisheries news log.

Work of All-Union Conference of Fisheries, Fisheries Management (Problems of Dynamical Enumeration of Fish, Fishing Prognoses, and Reproduction of Fish, Stocks), 602 pp., illus., printed in Russian. Akademija Nauk SSSR., Ihtiologitseskaja Komissija, Moscow, Russia, 1953. Part II-Reports and Discussions on the Problems of Enumeration of Fish and Fishing Prognoses--contains, among others, the following reports: "Pluctuations in Numbers of Fish and Methods of Prediction of Fishing Results," by T. F. Dementjeva; "On the Causes of Fluctuations in the Amount of Pacific Salmon and the Problems in the Rational Use of Stocks," by R. S. Semko; and "Inknown Factors Relating to Enumeration of Herring," by A. N. Svetovidov. Part IV-Reports and Discussions on Problems of Biological Productivity of Waters--contains, among others, the following reports: "On Problems of Biological Productivity of the Sea and its Importance for Fisheries Economy," by V. A. Vodjanitskii; "Regarding Protection of Fish Food Resources in Sea Water," by L. A. Zenkevich; and "On the Ways of Increasing Fish Food Production in the White Sea," by V. V. Kuznetsov.



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FISH PARADE (OCT. 29-NOV. 3)

NATIONAL PROGRAM: Advertisements reproduced below were scheduled to appear in Chain Store Age, Nargus Bulletin, Frozen Food Age, Progressive Grocer, American Restaurant, Restaurant Management, and Fountain & Fast Food



magazines beginning in July and running through September. Also, a number of other publications are carrying this same story, through their editorial pages, to their readers throughout the country.

The National Retail Grocers Association and the National Restaurant Association are cooperating and were to send out material to all of their members. Many chain store companies have in-

dicated that they want to tie-in with the program.

The Reynolds Metals Company will, through their national television network program, "Circus Boy," kick off the program by featuring the 1956 "FISHPA-RADE" on Sunday night, October

Join the
FISH PARADE

Oct. 29-Nov. 3

Wider Menu Variety
Finer Taste
Greater Economy

PUBLICITY: An all-industry consumer and trade publicity campaign will run in newspapers, magazines, radio, television, and grocery and restaurant publications. Chain and independent retail organizations are advising their members how they can cash

in on this promotion. Allied industries such as the Rice Industry will feature the "FISH PARADE" in their own publicity and advertising.

FISH AND WILDLIFE SERV-ICE COOPERATION: The Fish and Wildlife Service will notify all food trade associations of the program, and will issue press releases by the



Secretary of the Interior announcing support of the program. Radio, TV, and press food editors will be contacted as well as state and local restaurant associations, public utility units, and similar marketing groups. The Department of Agriculture will list the program as a Merchandising Opportunity in the tie-in material that goes to the Plentiful Foods List.

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COMMERCIAL DEVIEW FISHERIES NEVIEW



Vol. 18, No. 10

OCTOBER 1956

FISH and WILDLIFE SERVICE United States Department of the Interior Washington, D.C.

JOHN L. FARLEY, DIRECTOR



COMMERCIAL FISHERIES REVIEW



A review of developments and news of the fishery industries prepared in the BRANCH OF COMMERCIAL FISHERIES

A. W. Anderson, Editor

J. Pileggi, Associate Editor H. M. Bearse, Assistant Editor

Mailed free to members of the fishery and allied industries. Address correspondence and requests to the: Director, Fish and Wildlife Service, U.S. Department of the Interior, Washington 25, D.C.

Publication of material from sources outside the Service is not an endorsement. The Service is not responsible for the accuracy of facts, views, or opinions contained in material from outside sources.

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The printing of this publication has been approved by the Director of the Bureau of the Budget, August 2, 1955.

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COVER: These ten trawlers were part of an over-all shipbuilding program designed to reestablish Korea's war-shattered fishing industry, on which that country depends for some 80 percent of its protein, The photograph shows the ten trawlers shortly after they were launched at the shipyard in Kowloon, Hong Kong, early in 1955. Originally purchased by UNKRA for the Korean fishing industry, these vessels recently were purchased by a new private Korean fishery firm (see p. 79 of this issue).

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GEORGES BANK HADDOCK FISHERY -- CHANGES IN SCROD ABUNDANCE IN RECENT YEARS

By John R. Clark*

Georges Bank (fig.1) has become a scrod $\frac{1}{2}$ haddock fishing ground during recent years due to an increased abundance of young haddock. Annual landings of

73° 72° 71° 70° 69° 68° 67° 66°

young haddock. Annual landings of scrod exceeded landings of large haddock in the Georges Bank fishery (fig. 2) for the first time in 1950, and have continued to do so every year since. Figure 3 shows how scrod landings have increased in relative importance.

Examination of the age composition of the landings revealed that the predominance of small scrod in the 1950 landings was due to an exceptional abundance of two-year-old haddock. 2/ These scrod were members of the 1948 year-class which proved to be stronger than any brood previously recorded. A considerable reduction in the size of fish landed due to large catches of small scrod caused a great amount of concern in the fishing industry.

Fig.1-The area referred to as Georges Bank in this report.

In the 1951 fishery the 1948 year-class continued to dominate the landings and provided a great abundance of large scrod. 3/ The fish of the 1948 brood were three years old in 1951 and having added another year's growth by then were of a more desirable size.

Scrod have continued to dominate the fishery since 1951 due to a series of strong-year classes in alternate years, yielding large catches first of two-year-olds, then of three-year-olds. This phenomenon is demonstrated in figure 4, which shows the number of each age caught during an average day's fishing. The dominance of the 1948 year-class as two-year-olds in 1950 and as three-year-olds in 1951 is evident.



Fig. 2 - Typical otter trawler employed in the Georges Bank Fishery

dent. The pattern is repeated for the 1950 and 1952 year-classes which dominated $\overline{*}$ Fishery Research Biologist, North Atlantic Fishery | 1/ Haddock weighing $1\frac{1}{2}$ - $2\frac{1}{2}$ pounds are scrod.

ish 2/ Commercial Fisheries Review, June 1951, 3/ Commercial Fisheries Review, August 1952,

* Fishery Research Biologist, North Atlantic Fishery Investigations, Branch of Fishery Biology, U. S. Fish and Wildlife Service, Woods Hole, Mass. the landings as two-year-olds in 1952 and 1954 and as three-year-olds in 1953 and 1955, respectively. The catch per day of two- and three-year-olds from the 1948,



Fig. 3 - Landings of large and scrod haddock from Georges

1950, and 1952 year-classes was considerably higher than from the average year-class of the base period, 1931-1948. The catch per day of four-year-old and older fish was somewhat lower during 1950-1955. From the age of four years on, haddock move rapidly into the "large" category. As their abundance is being reduced at the rate of about 50 percent each year by the present intensive fishery, the yield of even the most abundant yearclasses, such as the 1948, 1950, and 1952 broods, diminishes rapidly from four years of age on.

Whether scrod will continue to dominate the landings depends on the abundance of two-



Fig. 5 - Biologist measuring discarded haddock aboard Boston trawler.

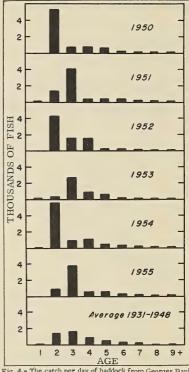


Fig. 4 - The catch per day of haddock from Georges Bank.

year-old haddock in the future. Because the 1953 year-class showed up so poorly as two-year-olds last year, we expect few three-year-olds in 1956 landings. Preliminary examination of 1956 records bears out this belief. The success of the 1954 brood cannot be accurately determined until next year, after the complete 1956 records have been analyzed. An accurate measurement of the 1955 year-class cannot be obtained until 1958. It is, however, possible to obtain an indication of the strength of year-classes from data on the quantity of one-year-old fish discarded in the fall of the year, a measure of which is obtained by Service biologists

aboard Boston trawlers (fig. 5). We are also able to judge the success of a yearclass from catches of young of the year and one-year-old haddock taken in special small-mesh nets on the Service's re-

search vessel Albatross III (fig. 6).

If our observations on abundance of young fish are correct, the abundance of scrod will be low during this current year. In the 1956 landings the quantity of large haddock landed is thus expected to surpass the quantity of scrod for the first time since 1949. It is likely that the scarcity of scrod will continue through 1957. More limited observations on the occurrence of the 1955 year-class indicate that it will be somewhat stronger than the brood of 1954 but not as strong as those of 1948, 1950, and 1952. Thus the scarcity of scrod could continue through 1958.

Although the large fluctuations in abundance of year-classes cannot be controlled by man, we can make the best use of what nature has provided. To this end the mesh regulation in effect on Georges Bank will increase the yield from each year-class as it passes through the fishery, but it cannot raise the original abundance of the brood. With the fishery so dependent upon scrod, a ser-



Fig. 6 - Hauling trawl aboard the U. S. Fish and Wildlife Services's research vessel <u>Albatross</u> ${\rm III}$ on a small haddock survey.

ies of unproductive year-classes could cause a reduction in landings in spite of the regulation. The use of large mesh will, however, reduce the possibility of such a decline becoming serious.

4 to

SPINY LOBSTER ALONG THE FLORIDA KEYS TRAVELS

Spiny lobsters were tagged by scientists from the Miami Marine Laboratory at various locations along the coast from Hillsborough to Key West. Over 5,000 tagged individuals were released from 1945 to 1949 and of these 251 were recovered. Some of the longest distances from point of release to point of reported recovery were from Pacific Light to near Key West, about 120 miles south, and from Upper Matecumbe to Hillsborough Light, about 130 miles north. In 1947 one lobster tagged at Cudjoe Key was recovered 123 days later near Loggerhead Key, a distance of 100 miles. The other long migrations took over a year.

Most recoveries were from less than 6 miles from the point of release after being free an average of 71.5 days.

Seasonal movements between inshore and offshore waters have been associated with the breeding habits and changes in water temperature.

During the months of February to April, the lobsters tend to collect in certain inshore waters while mating. From April to June the females move into deeper water, where the eggs are laid, and return again to the inshore waters during July and August. Spiny lobsters also tend to move offshore during the cold months of December and January.

--Sea Secrets, The Marine Laboratory, University of Miami, Coral Gables, Fla.

BLEEDING AND HEAT DEATH IN THE SOUTHERN OYSTER $^{1/}$

By Milton Fingerman* and Laurence D. Fairbanks*

In a previous investigation (Fingerman and Fairbanks 1956) the authors postulated that (1) the oyster (<u>Crassostrea virginica</u>) has very little ability to control the volume of its body fluids and (2) one of its responses to physiological stress is



Fig. 1 - Examining oysters under a microscope. In the rear are holding tanks with oysters.

a generalized bleeding, loss of body fluids. The experiments described below were designed in order to test this hypothesis by determining if application of heat evokes the bleeding reaction.

In the first series of experiments oysters were heated at different rates. The number of survivors and weight changes were noted. The slower the rate of temperature increase the lower was the temperature required to kill 50 percent of the oysters. With rapid temperature increase, 13.2° C. per hour, 50 percent of the oysters were killed at 47.5° C.; whereas with a temperature rise

whereas with a temperature rise of 0.74° C. per hour, 50 percent were killed at 41° C. Thus the upper lethal temperature of the oyster depends upon the rate of temperature rise. The oysters also lost body fluids in response to the heat shock. The amount of fluid lost varied inversely with the rate of temperature rise, i.e. oysters heated slowly lost more body fluids than oysters heated rapidly.

In the second series of experiments oysters were placed directly into constant temperature baths thus utilizing an abrupt rather than a gradual thermal change as

was done in the first series of experiments (fig. 3). No heat death occurred among oysters maintained at 35° C. Twenty-nine percent were killed after three hours at 40° C. Fifty percent were killed after 25 minutes at 45° C. The higher the temperature of the water bath, the faster the oysters were killed. The loss of body fluids was also determined at the time the oysters were removed from the water baths. The results (fig. 4) indicated a relationship between exposure time, temperature, survival, and body-fluid loss. However, the relationship is not a simple one for an oyster does not die when it has lost a definite percentage of its original body



Fig. 2 - Examining oysters in the holding tanks.

weight as body fluid. A higher temperature, e.g. 45° C., caused greater fluid loss and more rapid death than did a lower temperature 42° C. Furthermore, for the same exposure period, greater survival and less fluid loss was evident at 42° C. than at 45° C. At the 50-percent survival level more body fluid was lost by oysters maintained at 45° C. than at 42° C. Oysters replaced in the holding tanks after removal from the water baths were able to take back some of the fluid they had lost.

* Department of Zoology, Newcomb College, Tulane University, New Orleans 18, La.

^{1/} This study was conducted under a contract between Tulane University and the U. S. Fish and Wildlife Service. It was financed with funds made available by P. L. 466, 83rd Congress, approved July 1, 1954 (referred to as the Saltonstall-Kennedy Act).

The results of these experiments support the hypothesis that generalized bleeding is one of the responses of oysters exposed to injurious stimuli. Apparently oysters have not evolved protective mechanisms since they are able to shut their shells and isolate themselves from injurious agents in their environment. However, when they are unable to counteract the harmful stimuli, the generalized response appears to be a loss of body fluids.

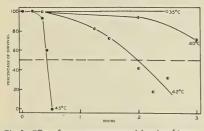


Fig. 3 - Effect of water temperature and duration of immersion on the survival of southern oysters.

Fig. 4 - Effect of water temperature and duration of immersion on the loss of body fluids in southern oysters.

During some preliminary experiments the observation was made that not all the oysters killed by the heat shock gaped as had been assumed by another investigator. The more rapid the rate of temperature rise, the greater the percentage of oysters that are killed with their shells closed tightly. Commercial users of oyster-shucking machines are faced with a problem in this regard because the machines are designed on the theory that all steamed oysters will gape.

LITERATURE CITED

Fingerman, M. and Fairbanks, L. D.

1956. Some Factors Affecting Fluid Loss in Southern Oysters. Commercial Fisheries Review, vol. 18, no. 1, (January), pp. 10-11.



DESCRIBING THE STATE OF THE SEA

The state of the sea may be expressed according to the following scale:

Height of Wave
0 or less than one foot
1 to 2 feet
2 to 3 feet
3 to 5 feet
5 to 8 feet
8 to 12 feet
12 to 20 feet
20 to 40 feet
40 feet and over

Description of Sea Calm sea Smooth sea Slight sea Moderate sea Rough sea Very rough sea High sea Very high sea Precipitous sea

--<u>Sea Secrets</u>, The Marine Laboratory, University of Miami, Coral Gables, Fla.

NEW DIVING SLED

By Reidar F. Sand*

A new tool for close-up views of fishing gear in operation has been added to the diving accessories used at the U. S. Fish and Wildlife Service gear research and development station at Coral Gables, Fla. This device, a controllable two-man

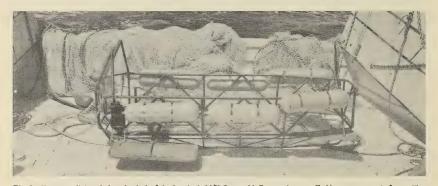


Fig. 1 - Two-man diving sled on the deck of the Service's M/V George M. Bowers is controlled by an operator in front. The second man in rear is free to make observations and photographs. submersible sea sled, allows the Service diving team to make on-the-spot observa-

tions of trawls, nets, and other gears while under tow from the research vessel.

The diving sled was fashioned by modification to an Air Force-type tubular steel ambulance litter. The litter frame forms the bottom of the sled and extensions of tubular steel to shoulder height of the sled occupant in sitting position form a guard rail affording a greater degree of comfort and protection than possible in free diving operations. Two 18" x 24" marine plywood control surfaces are located low and forward to effect the best control. These control surfaces are actuated by a single-stick aircraft-type control column using three 45° bevel gears allowing both vertical and lateral control. Steel fins added at the rear of the sled give additional stability to the vehicle.

A "windshield" of 3" lucite is installed forward to relieve sled occupants of some of the impact of water slipstream. Six Air Force-type 400 P.S.I. oxygen bottles are strapped to the upper sled rail giving the vehicle a slightly positive buoyance. The original steel-mesh webbing on the bottom of the litter provides a nonskid cockpit for the craft.

While under tow at either of two towing points forward, the sled has demonstrated a high degree of maneuverability and is capable of descending and ascending easily, and of performing complete rolls.

Both occupants of the sled wear SCUBA (self-contained underwater breathing apparatus) allowing full freedom of motion for piloting the craft and for observations. Other protective diving gear includes CO₂ inflated life preservers, diving knives, quick-release life belts, shark repellent, and depth meters.

* Chief, Gear Research and Development Program, Exploratory Fishing and Gear Development Section, Branch of Com-

mercial Fisheries, U.S. Fish and Wildlife Service, Coral Gables, Fla.



Fig. 2 - An exposure meter for underwater use is examined by divers of the Coral Gables gear research and development staff. For safety in operations a three-man diving team is used, consisting of a sled operator, underwater photographer and safety man, who remains on "standby" in the skiff,

This handy research tool has allowed researchers to observe and inspect trawls and other gears from all angles and distances, and come into actual contact with the gear



Fig. 3 - Divers put on equipment in the skiff and then transfer to the sled. The fully equipped safety man stays in the skiff.



Fig. 4 - In position above trawl net, divers descend to make underwater pictures.

while under tow at speeds to $3\frac{1}{2}$ knots. Still and motion picture photography have been accomplished safely to depths of 60 feet. When observations with the underwater television gear or remote camera device are not feasible, the diving sledhas been found to be quite useful and a valuable aid to fishing-gear research.



valve.



EXPERIMENTAL FISH MEAL DRYER

A small laboratory-scale direct-heat dryer has been constructed at the Service's Seattle Fishery Technological Laboratory for use in the research on the nutritive value of fish meal. It consists of (1) a rotating inner drum with parallel



Removal of meal from the laboratory-scale direct-heat fish meal dryer.

adjusted by manual manipulation of the gas flow by means of an indexed needle

vanes to distribute and tumble the meal while drying; (2) a stationary drum or housing to confine and direct the hot gasses around the rotating drum; (3) a nozzle-type gas burner as a heat source; and (4) accessories-drum motor, exhaust fan, thermocouples, and air ducts. The dryer is 60 inches long and 24 inches in diameter, with the inner rotating drum 30 inches long by 12 inches in diameter. Press cake is dried within about an hour's time in batches; four to five pounds of meal are dried per batch. The temperature within the dryer can be maintained at a predetermined setting with a range in the uniformity from one point to another of about 3° F.; the temperature is

In preliminary experiments, whole herring and tuna waste were dried successfully. The dryer will be used in preparing samples of meal under carefully controlled conditions for study in collaborative tests under way between Fish and Wildlife Service, the University of California, and the University of Wisconsin.



EXPERIMENTAL BULK OCEAN SHIPMENTS OF ALASKA HERRING MEAL

In recent years a serious economic problem of the Alaska herring meal and oil industry has been the high cost of handling the meal in sacks at the reduction plant and at the ultimate destination. Handling and shipping the meals in bulk has been suggested as a possible solution to the problem. This presents another problem, namely, the danger of spontaneous heating of the herring meal, which, in ocean shipment, can be serious.

During the summer of 1956, investigations were initiated at the Fish and Wildlife Service technological laboratories in Ketchikan, Alaska, and Seattle, Wash., to study the problem of bulk-handling herring meals. Plant tests, recently conducted



Brailing pursed herring destined for reduction to herring meal,

by a technologist from the Ketchikan laboratory, indicated that the addition of an oil antioxidant to the meal as it leaves the dryer was effective in reducing the temperature of herring meals stored in confined areas. Additional experimental work is necessary, however, before all the answers to these problems are known.



PROCESSING STUDIES ON MENHADEN MEAL

Bacteriological, chemical, and engineering investigations of current practices in the curing of menhaden fish scrap have indicated the possibility that the present routine "pile-turning" practices could be modified to the advantage of the processor. The studies are part of an extensive U. S. Fish and Wildlife Service research program on fish meals supported by funds made available through Public Law 466, commonly known as the Saltonstall-Kennedy Act of 1954.

These investigations constitute the second phase of the fish-meal processing studies initiated last year. An important conclusion already made, as a result of the investigation, has been to question the practice of routine "turning" of piles of scrap one or more times a day to dissipate the heat generated in the interior. Temperatures of the interior of the piles will be determined by suitable temperature indicating devices. It is probable that there are two factors, oxidative and bacterial, responsible for the increase in temperature, and an evaluation is being made of their comparative importance. Recommendations can then be made regarding need for alterations in methods of handling.

The investigations are being conducted at the plants in the various areas where menhaden are utilized. The mobile trailer laboratory, assigned to the Service's Fishery Technological Laboratory, College Park, Md., has been suitably equipped and is being used for the bacteriological and chemical aspects of these studies.



ANTIOXIDANTS IN FISH MEALS

Continuing studies on the synergistic effect of mixtures of antioxidants in minimizing oxidative deterioration in fish meal have revealed that the effectiveness of a given antioxidant or mixture of antioxidants depends on how well it is mixed in with the meal. This research is being undertaken in the Department of Food Technology at the University of California in collaboration with the Seattle Fishery Technological Laboratory of the U. S. Fish and Wildlife Service as a part of the research program under Public Law 466, commonly referred to as the Saltonstall-Kennedy Act of 1954. The antioxidants that have been studied so far are butylated hydroxyanisole (BHA), butylated hydroxytoluene (BHT), diphenyl-paraphenylenediamine (DPPD), nordihydroguaiaretic acid (NDGA), and 1, 2-dihydro-2, 2, 4-trimethyl-6-ethoxyquinoline. Of these, the last appeared to be the most effective single antioxidant. Mixtures of the antioxidants appear to have an enhanced effect. Subsequent to the inception of these studies, the use of DPPD for this purpose has been prohibited by the Food and Drug Administration, pending further investigation of its physiological effects.

In work at the Seattle Technological Laboratory, these findings on the necessity of thorough mixing of antioxidants and meal were confirmed independently. It thus appears that the usefulness of antioxidants in reducing oxidative deterioration in commercial fish meals is quite promising, and further research should be very profitable. The choice of antioxidant or of mixtures of antioxidants is determined by the following criteria:

- 1. Effectiveness in inhibiting oxidation.
- 2. Adaptability to commercial processing conditions.
- 3. Cost.
- 4. Toxicological properties and Federal approval.



CONVERTING FISH SCALES INTO ANIMAL FOOD

Contrary to general opinion, fish scales are digestible and the U. S. Fish and Wildlife Service is seeking the best ways to make the high-protein content of this waste available for animal food.

Two research studies on utilization of fish scales are in process. One, at the Service's Fishery Technological Laboratory at College Park, Md., in cooperation with Georgetown University has already proved that dried ground pollock scales are readily digested by rats used as experimental animals. The second stage, now in progress, will involve experimentation to determine the composition of a diet designed to utilize fully the nutritive value of the scales.

The second study, being conducted at the University of Massachusetts, involves modification of the scales by chemical treatment before feeding them to rats and chickens. The work in Massachusetts is being done under a Saltonstall-Kennedy Act (1954) contract.

Experimentation was started to find a way to utilize profitably fish scales which for many years have been nothing more than a troublesome waste material.

There has been a market for certain types of fish scales for some years, but the market demand and the supply have failed to coincide in most instances. Some years ago it was learned that fish scales could be used to make foam-firefighting material. Lack of an available supply of suitable fish scales forced the makers of firefoam to seek other material for their operations. The iridescent matter on fish scales, known as pearl essence, is also used in making jewelry and certain lustrous paint but the scales of only one or two species of fish are all that have been successfully used in this work.



SALMON WASTE AS BAIT

An interesting development in southeastern Alaska during recent years has been the growth of industries utilizing selected portions of the waste from salmon canneries as bait.

A few years ago, a West Coast bait company started collecting large quantities of chum salmon eggs for packaging and sale to sports fishing enthusiasts. This operation is still in progress. A small industry has developed this year from the collection, packaging, and freezing of pink salmon heads for use as bait in the commercial halibut fishery. The use of salmon heads as a halibut bait is not new. In the past, individual fishermen have collected fresh heads during the canning season. The present innovation, however, is the first effort to be made in this area to make frozen salmon heads available commercially on the same basis as frozen bait herring.



BREADED SHRIMP INTERIM FEDERAL SPECIFICATION

The Interim Federal Specification for "Shrimp, Breaded, Raw; Frozen," PP-S-00315, was issued July 12, 1956, by the General Services Administration (GSA).

This specification was developed by the Quarter-master Food and Container Institute for the Armed Forces and the U. S. Fish and Wildlife Service, based on currently-available technical information. It has not been approved for promulgation as a Federal Specification and is subject to modification. It will be converted to a Federal Specification after further industry and Federal agency conferences. Government purchases are customarily made on the basis of specifications developed by Government-employed experts in the various fields with cooperation from industry.

The specification deals with the quality-level required, species of shrimp to be used, allowable percentages of breading, composition of breading, and packaging methods and materials for specific uses. Processors when preparing frozen raw breaded shrimp for Government purchase, whether for civilian or military use, should be governed by the requirements of this specification although its use, at this stage of development, is usually optional.



Fig. 1 - Cooked and peeled shrimp on automatic grader prior to being breaded and packaged.

Single copies of this specification required by activities outside the Federal Government for bidding purposes are available without charge at the General Services Administration Regional Offices in Boston, New York, Atlanta, Chicago, Kansas City, Mo.; Dallas, Denver, San Francisco, Los Angeles, Seattle, and Washington, D.C.



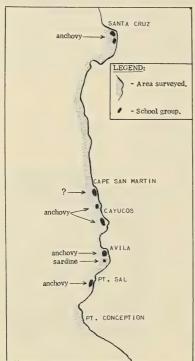


California

ABUNDANCE DETERMINATION OF SARDINES AND ANCHOVIES IN CENTRAL CALIFORNIA (Airplane Spotting Flight 56-6): To determine the abundance and distribution of sardines and anchovies in the inshore area of Central California between Santa Cruz and Pt. Conception was the purpose of an airplane spotting flight on

(1359D).

served.



Airplane spotting flight 56-6 (July 30, 1956).

This flight was scheduled to cover the area between Bodega Bay and Pt. Conception, but fog prevented scouting of the entire area north of Santa Cruz and of small areas near Pt. Sal and Pt. Buchon. A total of 280 miles of coastline were covered, in which 110 schools of anchovies, totaling 898,000 sq. ft., 2 schools of sardines totaling 6,700 sq. ft., and 15 unidentified schools were obtain.

July 30 conducted by the California Department of Fish and Game Cessna "170"

In June 1956, 465,000 sq. ft. of anchovies were observed in the San Simeon-Pt. Conception area, whereas on this flight 715,000 sq. ft. of anchovies were tallied in this area, indicating an increased concentration over last month. In the Monterey Bay area 491,000 sq. ft. of anchovies were tallied in June and 182,700 sq. ft. in July. Inasmuch as the area between Santa Cruz and Davenport was not scouted, it is not certain whether the above figures for Monterey Bay indicate a true decrease.

Two small schools of sardines were seen five miles south of Avila. Three days previous to this flight two commercial aerial spotters scouted the area from Morro Bay to Pt. Conception and found only a few small sardine schools in the area between Pt. Arguello and Pt. Conception. No schools of any species were observed in the area between Pt. Conception and Pt. Arguello on this flight.

Fifteen schools of unknown species were observed in shallow water three miles south of Cape San Martin. Two of these schools were black in color and close observation failed to distinguish individual fish or flashes. The other twelve schools

were reddish-orange in color and may have been either juvenile anchovies or juvenile rockfish.

* * * * *

FIRST SILVER SALMON TAKEN IN SACRAMENTO RIVER: Possibly the first adult silver salmon ever taken in the Sacramento River has been trapped at Cali-

fornia's Department of Fish and Game tagging station at Fremont Weir near Knights Landing.

Fisheries biologists say there is little doubt that the 16.7inch fish was the first return from some 60,000 yearling silvers plant-



ed in Mill Creek last spring. Some of these fish were as much as nine inches long when stocked in the creek, which is a major salmon and steelhead spawning tributary of the Sacramento.

It is not unusual for steelhead to be planted as yearlings in the spring and return upriver from the ocean in the fall. The silver salmon trapped and examined by the biologists was mature and probably would have spawned later this fall.

The experimental plant of silvers was made in the hope that a run of silvers could be established in the Sacramento system. They enter coastal streams both north and south of the Golden Gate, but never have entered the Sacramento River system before.



Albacore tuna tagging by M/V \underline{N} , \underline{B} , Scofield (Cruise 56-S-3, July 2-23, 1956).

ALBACORE TUNA TAGGED BY M/V "N. B. SCOFIELD" (Cruise 56-S-3): To tag albacore with type G "spaghetti" tags as a part of migration and growth studies; to experiment with different colored tags to determine if tag color has any relationship with tag recovery success; and to make biological and oceanographical observations in respect to occurrence of albacore were the objectives of Cruise 3 of the research vessel N. B. Scofield of the California Marine Fisheries Branch. The vessel left San Pedro July 2, 1956; fished the area off the coast of Southern California and northern Baja California encompassed by latitude 29 N. to 32 N. and longitudes 116 W. to 119 W.; returned to San Pedro July 23.

* * * * *

Albacore were caught by means of both live bait and trolling jigs. All albacore caught in good viable condition were tagged, measured, and released. The red, white, and blue tags, all type G with jackets, were applied in alternating-color groups of five tags per group. General observations included Bathythermograph casts, weather, and incidental marinelife sightings.

A total of 420 albacore were tagged, 140 of each color, and released. All fishing was done in the vicinity of the commercial fleet, which was in full operation

during the cruise. Roughly two-thirds of the fish were caught trolling feather jigs and the remainder on bait. Rough weather and poor fishing during the first ten days greatly hampered the tagging operation.

Examination of albacore stomachs revealed that the Pacific saury (Cololabis saira) made up the bulk of the food. Quantities of red crab (Pleuroncodes sp.) and a species of rock fish, Sebastodes, were quite common in the fish from the southern extremity of the area fished. Large concentrations of tunicates (Pyrosomasp.) were observed in the vicinity of lat. 31°-35′ N., long. 118°-30′ W. Finback and California gray whales were sighted on several occasions in the central and northern parts of the area fished. Night-light collections yielded mostly saurys and a

> few yet-to-be-identified fish. Fish of various species were collected from a bait net haul at

Cape Colnett, Baja California.

Surface water temperatures in the areas fished ranged between 16.1°C. (60.9°F.) to 18.6°C. (65.8°F.). Fishing was at optimum in the range 16.1°C. (60.9°F.) to 16.6°C. (62°F.). Fifteen Bathythermograph casts were made in the areas fished.



M/V Lucky Star tuna-tagging Cruise 56-C-3 (July 2 - Aug. 3, 1956).

* * * *

CLIPPER TAGS YELLOWFIN AND SKIP-JACK TUNA (M/V "LUCKY STAR," Cruise 56-C-3): Tagging of yellowfin and skipjack tuna was accomplished by the tuna clipper Lucky Star on this cruise (July 2-August 3, 1956) conducted by the California Department of Fish and Game. Operations were concentrated off the coast of Baja California and Roca Partida Island (one of the Revilla Gigedo Island group). A total of 661 yellowfin and skipjack tuna were tagged and released with type 'G' tags. Three types of colored tags were used: red, white, and blue.



Cans--Shipments for Fishery Products, January-June 1956



Total shipments of metal cans during January-June amounted to 51.991 short tons of steel (based on the amount of steel consumed in the manufacture of cans) as compared with 45,137 tons in the same period of 1955. The increase in this year's shipments reflects the heavier pack of canned tuna as compared with the January-June 1955

period (when production was curtailed due to oversupply) and also the increased activity in the packing of Maine sardines, salmon, and other fishery products which

begins in June

Note: Statistics cover all commercial and captive plants known to be producing metal cans. Reported in base boxes of steel consumed in the manufacture of cans, the data for fishery products are converted to tons of steel by using the factor; 23.0 base boxes of steel equal one short ton of steel.



Federal Purchases of Fishery Products

FRESH AND FROZEN FISHERY PRODUCTS PURCHASED BY THE DEPART-MENT OF DEFENSE, JULY 1956: For the use of the U. S. Army, Navy, Marine Corps, and Air Force the Army Quartermaster Corps in July 1956 purchased

3,184,000 pounds (valued at \$1,615,000) of fresh and frozen fishery products. This was 16.3 percent more in quantity and 30.8 percent more in value than purchases the previous month and 57.5 percent more in quantity and 98.6 percent greater in value than purchases in July 1955.

	Purchases of Fresh and Frozen Fishery Products by							
1	Department of Defense (July and the First Seven							
١	Months of 1956 with Comparisons)							
ı	QUANTITY				VALUE			
July JanJuly		-July	July		JanJuly			
				1955	1956		1956	1955
ı	(1,000 Pounds)				(\$1,			
	3,184	2,022	15,415	15,136	1,615	813	7,705	6,441

During the first seven months of 1956 purchases of fresh and frozen fishery products totaled 15,415,000 pounds (valued at \$7,705,000)--1.8 percent more in quantity and 19.6 percent more in value than purchases for the same period a year earlier. This shows that this year purchases were composed of higher-priced products.

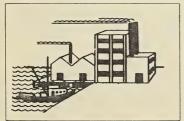
Prices paid for these fishery products by the Department of Defense in July averaged 50.7 cents a pound as compared with 45.1 cents a pound the previous month and 40.2 cents a pound in July 1955.

In addition to the purchases of fresh and frozen fishery products reported, the Armed Forces generally make some local purchases which are not included in the data given. Therefore, actual purchases are higher than indicated, but it is not possible to obtain the local purchases made by military installations throughout the country.

<u>CORRECTION</u>: In the August 1956 issue of <u>Commercial Fisheries Review</u> in the news item "Federal Purchases of Fishery Products," the first sentence of the first paragraph should have given the May 1956 purchases as "2,715,000 pounds" instead of "2,715 pounds" as shown. The figures which appeared in the table shown in that issue were correct

* * * * *

CANNED FISHERY PRODUCTS PURCHASED THROUGH QUARTERMASTER MARKET CENTERS, APRIL-JUNE 1956: Canned tuna and sardines were the princi-



Quartermaster Market Centers, January- June 1954-55						
	Tuna	Salmon	Sardines			
(1,000 pounds)						
JanJune 1956	2,188	601	227			
Jan -June 1955	716	2 236	63			

939

Conned Fighamy Products Dunchaged Through

pal canned fishery products purchased for the use of the U. S. Army, Navy, Marine Corps, and Air Force by the Army Quartermaster Corps through its Market Centers during the

second quarter of 1956. Purchases amounted to 792,000 pounds of canned tuna and 219,000 pounds of canned sardines.

Jan.-June 1954....

It is believed that only a portion of the requirements for canned sardines are represented in the data given since some canned sardines and canned fishery products other than tuna and salmon are procured locally and no information is available on those purchases. Therefore, actual canned fishery products purchases are higher than indicated.

Filme

FISHERY FILMS SHOWN AT VENICE EXHIBITION: The four Department of the Interior documentary films which were recently selected for showing at the Edinburgh Film Festival were also chosen for display at the International Exhibition



"Outboard Fisherman U. S. A."

of Cinematographic Art at Venice, Italy it was announced August 17. The films were to be shown in the Exhibition of Documentary and Short Length Films, a section of the International Exhibition, August 16 to August 25. The films are 16 mm. with color and sound.

The four films were produced by the Department of the Interior in cooperation with industry. Two of the films were made under the direction of the Bureau of Mines and two under that of Fish and Wildlife Service.

Fish and Wildlife Service films have been honored at the Venice International Exhibition on four other occasions. One Service film It's the Maine Sardine, won first place in the public relations catagory in 1949.

The Fish and Wildlife Service films selected for the Venice exhibit are:

Outboard Fisherman U.S.A. shows the taking of fish in ten different parts of the country from Maine to Alaska. It was sponsored by the Outboard Marine and Manufacturing Company of Milwaukee, Wis.

Shrimp Tips from New Orleans, sponsored by the Peelers Company of that city, makers of processing equipment, portrays the culture and glamour of the southern metropolis--and six of its favorite shrimp recipes.

The Bureau of Mines films selected for the Venice exhibit are:

The Petrified River--The Story of Uranium, a documentary of the greatest metal hunt in history. It was sponsored by the Union Carbide and Carbon Corporation and tells the story of uranium from its source to many of its peacetime applications.

Arizona and Its Natural Resources, a film sponsored by the Phelps-Dodge Corporation shows how the mineral and agricultural resources are being developed and utilized for the benefit of mankind.

These films may be secured on a loan basis without charge. Only one of them, however, <u>Arizona and its Natural Resources</u>, is available at the present time. The other three will probably be ready for distribution in September.

The United States Government films are selected for international showing by the Interdepartmental Committee on Visual and Auditory Materials for Distribution Abroad.

Other Department films which have been shown in Venice are: The Story of Menhaden, 1951; Food for Thought, 1950; Filleting and Packaging Fish, 1947; and California and its Natural Resources, 1949.

Note: Also see Commercial Fisheries Review, August 1956, p. 23.

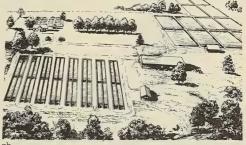


Fish Hatcheries

WORK ON SIX NEW HATCHERIES STARTS: Engineering work on the \$2,856,000 Federal fish-hatchery program which has received Presidential approval will begin

at once, and actual construction will get under way as quickly as possible, Secretary of the Interior Fred A. Seaton said August 17.

Of the total available, \$1,060,000 is for six new hatcheries, two of which will be enlarged replacements for existing facilities. Two hatcheries are being constructed for the propagation of trout only, two for warm-water fish only, and two are combination facilities for both trout and warm-water fish.



Both catchable-size and fingerling trout will be produced. The warm-water hatcheries will rear walleye and northern pike fry, and bass, bluegill, and catfish fry and fingerlings. The six new hatcheries will be located at Miles City, Mont.; Pittsford, Vt.; John Rock area near Brevard, N. C.; Paint Bank, Va.; Cedar Bluff, Kans .; and one in West Virginia.



Frozen Foods Temperature Tolerance

Although no fishery products are involved, results of a research project on time-temperature tolerance of frozen foods are of interest to packers and distributors of frozen fishery products. Industry and government representatives discussed these results in a conference held July 30-August 1 at Albany, Calif. The project was begun several years ago in the Western Utilization Research Branch of the U. S. Department of Agriculture.

The project was to obtain information for use in the commercial handling of frozen foods from producer to consumer. From a few at the beginning, thousands must handle and use commercial frozen foods. As frozen foods move from packer to warehouse to distributor to retail store and consumers, they move in diminishing unit quantities and into custody or ownership of an increasing number of people.

The results establish, for each frozen food, just how much faster quality change takes place at 10^6 F., 20^6 , or 30^6 than at 0^6 Products change at different rates under the same conditions. Partial damage, no matter how minute or slightly detectable on casual examination, is never reversed by reduction of temperature. By and large, geographical variations were found to be small. Within limits, certain

changes in raw material and processing (including packaging) strengthen frozen foods against temperature hazards.



Fur Seals

SERVICE BEGINS HARVESTING FEMALE SEALS OF PRIBILOF HERD: As a step toward maintenance of the Pribilof Islands fur-seal herd at an optimum level—in terms of both biology and economics—the 1956 operations have been expanded to include the harvesting of some female seals,



the U. S. Fish and Wildlife Service announced August 30, 1956.

About 30,000 females are to be taken in the harvest, and the information which will be obtained this year real-time to the time and

About 30,000 females are to be taken in the harvest, and the information which will be obtained this year relative to the time and conditions for taking females will give the Service, which has the responsibility for the seal herd, the design of its future operations.

The Pribilof Islands fur-seal herd was near extinction in 1911 when pelagic sealing-harvest on the high seas-was banned by treaty. The herd numbered only 125,000 animals at that time, compared with 1,750,000 today. The first step in restoration of the herd following ratification of the 1911 Convention was to discontinue all land killing for five years. At that time killing of males

was resumed, but was limited only to those surplus to the needs of the growing herd. All of the females were needed during this restoration period, but a part of the male population was surplus because these animals are polygamous, having harems of 50 or more females, although at birth they are present in equal numbers. By this method of management, approximately 2 million surplus male seals were killed during the restoration. The herd now is fully restored.

Service officials anticipate that killing 30,000 cow seals a year will relieve the congested rookeries and reduce pup mortality. As a result of the increased pup survival, because half of them are males, there will soon be more three- and four-year males in the herd and a larger-harvest possible without any decline in the herd's productivity. In short, an added harvest is substituted for annual mortality.

Service officials intend to pay particular attention to the size and condition of the herd during the taking of the females. The harvest of females, the first such harvest in nearly 50 years, began with the regular season-mid-June--and continued until August 15. Operations will be resumed early in September and will continue until mid-October 1956.

Since it has been nearly 50 years since American sealers have taken female pelts, little is known about the time when the quality of these skins is best, or the best conditions under which the females should be harvested. Records are being kept on a day-to-day basis on the condition of the pelts, the condition of the rookeries, the difficulties encountered in taking the cows, the effect of weather, the effect of late season operations as well as comments and suggestions on harvest operations. Each female skin will be marked in such a way that the date of taking can be determined at any stage of the processing. In this way it will be possible to learn the periods at which the skins are at their top value.

The male pelt is best when the animal is three or four years old. Since the old bulls maintain harems of between 25 and 100 cows, and drive the younger males away from the herd, the age group wanted for harvest is automatically segregated. The harvesting policy of 65,000 males annually permits about 10 percent of the younger bulls to reach breeding age -- the seventh year -- and establish harems.

As far as is known now, the female pelt is good at any mature age. This considerably widens the harvest age of the seal herd. The life span of the fur seal is about 19 years, and the female begins to bear young at about three years. The female seals arrive on the Pribilofs early in June after almost a year at sea. The old males precede them by two or three weeks and the younger seals follow them by a week or two. The pups are born shortly after the females arrive at the rookeries. Each has but a single pup-average weight 12 pounds-in any one year. The nursery season for the new pup is also the new mating season.

The Pribilof Islands in the Bering Sea are five in number, the largest being St. Paul Island. It is 14 miles in length. St. George Island, 40 miles away, is second in size--about 10 miles in length.

Records show that before 1834 the Russians, who at that time owned Alaska and the Pribilofs, took 2 million seal pelts. Because of the decrease in the size of the herd, the Russians placed restrictions on the harvest and from 1834 until the United States took over the Islands with Alaska in 1867, only 600,000 pelts were taken.

From 1870 until 1910 the United States permitted the land killing of seals on a lease basis. During the first 20-year period the taking of 100,000 pelts a year was permitted. The total harvest for that period was 1,927,377 pelts which brought the United States Government \$6,020,152 in revenue. During the next 20 years there was a sharp decrease in numbers of seals and the take was only 342,651 pelts for which the Government received \$3,453,844. In addition, many thousands of seals were killed during this period by small vessels operating on the high seas without regard for the future of the resource. Pelagic sealing was wasteful, since many killed animals were lost, and since the killing was indiscriminate.

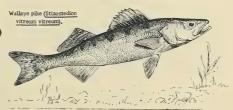
Then in 1911, pelagic sealing was banned and land killing was discontinued for five years. Since then the harvesting of the Pribilof Islands' seals has been exclusively on land as a United States Government responsibility, administered first by the Secretary of Commerce and now by the Secretary of the Interior.



Great Lakes Fishery Investigations

WALLEYE ABUNDANCE IN SAGINAW BAY DURING SUMMER STUDIED BY M/V"CISCO" (Cruise 3): To determine the species composition and abundance of

of fishes in shallow water during the summer, with special attention given to walleye, was the purpose of Cruise 3 (July 11-23, 1956) of the Service's research vessel Cisco. This cruise was confined entirely to Saginaw Bay and portions of Lake Huron immediately adjacent to the Bay. During the summer walleye practically disappear from the commercial trapnet fishery of the Bay.



Nylon gill nets with $2\frac{1}{4}$ -, $2\frac{1}{2}$ -, $2\frac{3}{4}$ -, 3-, and 4-inch mesh were set on the bottom at 4 fathoms just north of Charity Island and in $2\frac{1}{2}$ -3 fathoms north of Sand Point, and another gang made up of $2\frac{1}{2}$ - and $3\frac{1}{2}$ -inch mesh was set in 3 fathoms off Au Sable Point. White suckers (Catostomus commersonnii) predominated in the catches off Au Sable Point and Sand Point and white suckers and alewives (Pomolobus pseudoharengus) made up the bulk of the catch off Charity Island. Three walleye (Stizostedion vitreum vitreum) were taken off Charity Island and 8 off Sand Point. Their lengths ranged from 11.5 to 19.7 inches. A moderate number of yellow perch (Perca flavescens) were caught in the smaller mesh sizes of nets set off Charity Island and Sand Point. Other species taken included 1 yellow bullhead (Ameiurus natalis), 2 channel catfish (Ictalurus lacustris), and one white bass (Lepibema chrysops).

The usual oblique sets of $2\frac{1}{2}$ -inch-mesh gill nets were made in 13 and 26 fathoms off East Tawas, and in addition an oblique set of $3\frac{1}{2}$ -inch-mesh nets was made at 13 fathoms. The $3\frac{1}{2}$ -inch mesh took only two perch and one bloater (<u>Leucichthys hoyi</u>), all at midlevels. The $2\frac{1}{2}$ -inch set in 26 fathoms took 2 perch, 1 <u>Leucichthys kiyi</u>, 6 smelt (<u>Osmerus mordax</u>), and 1 bloater, scattered throughout the net except in the top 20 feet. Thirty-three bloaters, 12 smelt, and 3 perch were scattered throughout the shallow set. A $2\frac{1}{2}$ -inch-mesh bull net 300 feet long and 120 meshes deep was set over a 26-fathoms bottom with its float line 6 feet below the surface. This net took 7 <u>Leucichthys alpenae</u>, 1 alewife, 9 smelt, and 1 perch.

Bottom trawling was carried out in several locations at depths ranging from $2\frac{1}{2}$ to $10\frac{1}{2}$ fathoms. Catches included mostly perch, smelt (approximately 4,750 of this species were taken in one 10-minute tow), alewives, and forage fish. Several white suckers and one carp (Cyprinus carpio) were also caught. Night midwater trawling was done in shallow water off Oscoda, Mich.; alewives dominated the catch.

The hydrographic transects from Bay City to East Tawas, East Tawas to Harbor Beach, East Tawas to Oak Point, and Hat Point to Au Sable Point were run as in the previous cruises. Surface temperatures ranged from 14.6° C. $(58.3^{\circ}$ F.) to 23.5° C. $(74.3^{\circ}$ F.).

CHUB POPULATION STUDIED IN LAKE HURON BY M/V "CISCO" (Cruise 4):
Work in Lake Huron by the Service's research vessel Cisco during Cruise 4 (July 31-

August 13, 1956) was primarily to investigate further the chub population. This cruise, duplicating Cruise 2, covered Saginaw Bay and part of southern Lake Huron. Nylon gill nets (mesh sizes 2, $2\frac{1}{4}$, $2\frac{3}{2}$, $2\frac{3}{4}$, 3, and 4 inches) were set in 25 fathoms off Harbor Beach and 50 fathoms in mid-lake between Harbor beach and Goderich. These gangs, except for



the addition of the 2-inch mesh, were identical with gangs set in the same locations during Cruise 2. The shallow set caught mostly bloaters (Leucichthys hoyi) as in Cruise 2, but the catch was considerably smaller if the 2-inch mesh is not considered. The 50-fathom set caught mostly L. kiyi, with a few L. reighardi, lake herring (L. artedi), bloaters, and longjaws (L. alpenae). The catch of the latter species was much smaller than in the previous set.

Oblique sets of gill nets were made off East Tawas in 13 and 26 fathoms as usual. The very light catches consisted of perch (<u>Perca flavescens</u>), smelt (<u>Osmerus mordax</u>), herring, and bloaters scattered throughout the nets, but mostly from 40 feet below the surface to the bottom. A bull net (300 feet long, 120 meshes deep)

was set over a 26-fathom bottom with the float line in the thermocline and the lead line beneath it. Only 3 smelt were caught. One of the main purposes of the oblique

sets and of fishing bull nets is to locate the summer grounds of the herring which enter Saginaw Bay in great numbers in the fall.

A gill net was set on the bottom in 4 fathoms off East Tawas. The rather light catch was predominately white suckers (Catostomus commesonnii), perch, and alewives (Pomolobus pseudoharengus). Of special interest were two rainbow trout (Salmo gairdneri) and one brown trout (Salmo trutta) in the catch.



 $\underline{\underline{\text{Cisco}}}$, Research vessel of the Service's Great Lakes Fisheries Investigations.

Several areas with good trawling bottom were located in Saginaw Bay. Large numbers of perch, smelt, and forage fish were taken in the trawls. Only one walleye was caught, and it is doubted that there are any large concentrations of this species in the Bay in the summer.

Collections were made with a seine in six areas along the northwest shore of Saginaw Bay in order to study the inshore fish faunas and especially to locate wallege fingerlings. No walleyes were taken, but good catches of perch and largemouth black bass (Micropterus salmaides) fingerlings were caught.

Hydrographic transects were run from Bay City to East Tawas, East Tawas to Harbor Beach, Harbor Beach to Goderich, East Tawas to Oak Point, and Hat Point to Au Sable Point. In addition to the usual limnological studies, photometer readings were taken at 23 stations. Surface water temperatures varied little over the Bay and Lake Huron proper, except for a narrow area of upwelling off the Canadian shore where a low reading of 12.1 C. (53.8 F.) was recorded. The highest surface temperature was 25.1 C. (78.4 F.) near the mouth of the Saginaw River in Saginaw Bay.

Ionizing Radiation Center Planned

Establishment of a Quartermaster Radiation Planning Agency to develop plans for operation of the Army Ionizing Radiation Center was announced early in September by the Department of the Army. The new Agency will function under the Quartermaster Research and Development Command at Natick, Mass. Eventually the agency will be located at the Army Ionizing Radiation Center, the site of which is yet to be selected.

In addition to planning operations of the Center, the new Agency will be responsible for integrating the Center's activities with those of the Quartermaster Food and Container Institute, Chicago, and other Quartermaster research organizations concerned with irradiation sterilization of food and other materiel. The Center, when in operation, is expected to have a peak capacity of 1,000 tons of irradiated food a month.

Research thus far conducted under the direction of the Army Quartermaster Corps has established the feasibility of utilizing nuclear emanations, such as gamma rays and electrons, instead of heat, to kill or inactivate micro-organisms which are responsible for food spoilage. The ultimate military and civilian advantages of the

process include a reduction in refrigeration requirements, reduced food losses, improved control of certain food-borne diseases, and a wider availability of fresh foods under field conditions, according to the Department of Defense release.



Market Outlook for Fishery Products

OCTOBER-DECEMBER, 1956: Good supplies of staple and specialty types of fish and shellfish will be available for the holiday and preholiday events of the fourth quarter, the U.S. Fish and Wildlife Service reports in the Commercial Fisheries



Outlook, October December 1956, issued October 16.

The quarter will be highlighted by a massive sales effort centered around the "Fish Parade," which is the industry's designation of its National Fish Week, October 29 to November 3. Such items as oysters, shrimp, crab, clams, lobster, salmon, halibut, tuna, sardines, fish sticks, and fillets, as well as other fish will be in good supply although the available quantities of some of

these items will be lower than a year ago. Prices for fresh and frozen fish and shellfish products will be slightly higher, but the general level of canned fish will be somewhat lower.

The quarter should see additional interest resulting from the adoption of voluntary Federal standards for fish sticks and an upturn in that sector of the fishing industry is expected.

Cold-storage stocks are down about seven percent from last year, but supplies are still ample with some items even being in better supply. Landings will follow the seasonal pattern, which means reduced activities in some fisheries.

The Alaska salmon pack (low last year) shows a gain. The Alaska pack as of September 1 this year was 2,819,000 standard cases, a 21-percent increase over the pack of September 1, 1955. The total pink salmon pack was down slightly but increases in the red and chum salmon packs more than offset the loss.

Oyster production will be in evidence on all coasts although the Atlantic oyster beds are still showing the effects of the hurricanes of recent years. But more Pacific Coast oysters will be available. A heavy and growing demand for small oysters from new consumer groups in areas where oysters were formerly not readily available is one reason why supplies will be trailing demand. Prices will probably be somewhat higher.

Shrimp landings up to the end of August were below expectations but September and October are the peak months for shrimp production barring unforeseen weather conditions. Lobster production in Maine was down one third as of July 31 and the landings usually drop sharply during the latter part of the quarter. However, fair supplies for the lobster lovers are expected. Spiny lobster imports and holdings are up. Hard crabs in the East are in moderate or good supply while the production of the Dungeness crabs in California is expected to rise sharply during the

quarter. Surf clam landings in New Jersey are up 26 percent, but Maine soft clam landings are lower by 19 percent.

Canned tuna is in good supply with the pack already 13 percent ahead of the corresponding period of last year. The halibut supply is higher than in 1955 and will be close to 67 million pounds, due to the extended fishing period. Maine sardine production is below normal but higher than in 1955; California expects a fair pack of California sardines.

New England groundfish landings will go into the seasonal decline; cod production is traditionally low in the fourth quarter; haddock landings will hold up until the middle of the quarter when a decided drop can be expected; the downward trend in the harvest of ocean perch has been reversed, but the 1956 catch will be short of the 200-million-pound average for 1950-54.



National School-Lunch Program

Producers and distributors of fishery products are finding that the school-lunch program is a potent market for their products. Not only is it a growing market, but it represents an opportunity to cultivate a taste for fishery products by children

during their formative years that will continue as they become the adult customers of the future. A large share of the U.S. Fish and Wildlife Service's educational and market development program consists of giving fish-cookery demonstrations before school-lunch supervisory personnel, to show the variety, versatility, and economy of fishery products in their menu planning.

The school-lunch program is big business. The National School Lunch Program is in operation in over 56,000 schools located in all the 48 states and most of the territories and possessions. During the past school year, around 1.8 billion meals were served to 10.6 million children.



A U. S. Fish and Wildlife Service home economist conducting a fishcookery demonstration before school-lunch supervisory personnel, an important part of the Service's educational and market development program.

For this coming school year, Congress has appropriated \$100 million. This is an increase of \$16.7 million over last year. Nearly \$84 million of this fund will be apportioned among the states, territories, and possessions, based on the number of children between the ages of 5 and 17, inclusive, and the need for assistance in each state. Each Federal dollar must be matched by \$3 from sources within the state if the per capita income in the state equals or exceeds the national average. The grant-in-aid program is administered in the states by state departments of education in accordance with agreements between those departments and the United States Department of Agriculture.

In addition to the above apportioned funds, \$15 million is available to the Department of Agriculture for the purchase and distribution to schools of foods which help to meet the nutritional requirements of school children. These foods are those which are in extra abundance or oversupply.

Most of the schools participating in the National Program serve a Type A lunch which includes two ounces of protein. If fish were used as the protein for only one meal a week in all the schools, it would require over 1.3 million pounds of boneless fish, such as fillets or canned, to serve the 10.6 million children.



Maine

NEW SARDINE FILM: The Maine Sardine Industry on August 16 started work on a new motion picture, which will be produced in cooperation with the U.S. Fish and Wildlife Service. The film will depict the use for and the home preparation of canned Maine sardines.

The Executive Secretary stated that a contract for the camera work had been let to a New York City firm and that shooting would start as soon as a script was completed and approved by the Maine Sardine Council. The production of the film will be under the direction of the Fish and Wildlife Service.

The 16 mm, film will be in full color with sound and will run for about 14 minutes. Approximately 75 copies will be obtained for national distribution. The film will be a follow-up to a previous film (It's the Maine Sardine) produced under the same type of cooperative arrangement.

Maine is to be the locale for much of the camera work and emphasis is to be directed on the convenience, low cost, high protein, and versatility aspects of canned Maine sardines as a food.



North Atlantic Fisheries Exploration and Gear Research

DIFFERENT TYPES OF TRAWL NETS TESTED (M/V "Delaware," Cruise 23 and M/V "Albatross III," Cruise 79): Experiments were conducted on various types



of trawl nets in the Georges Bank area on a joint cruise of the Service's research vessel Albatross III and the exploratory fishing vessel Delaware between July 23 and August 4, 1956.

Mission of these tests was:
(1) to compare the fishing powers
of a high-opening trawl of new design with the trawl net now in standard use by the haddock fishery,
and (2) to determine to what degree
haddock escape through the meshes of various sections of the trawl.

The Service's research vessel Albatross III. In order to make the results most valuable and for comparison, the vessels towed the nets used side by side, as close together as possible. The simultaneous tows were conducted in three phases:

(1) Both vessels towing the standard #41 trawl to establish the uniformity of catching power of the nets of the two vessels. The catches of haddock by the two nets were found to be virtually uniform.

- (2) The Albatross III towing the standard #41 trawl and the Delaware towing the special "Balloon"-type #41 trawl. Significantly lower catches of haddock were made by the "balloon" trawl.
- (3) The Delaware towing the standard #41 trawl; the Albatross III towing a standard #41 trawl with large and small mesh in various sections of the net. The lower wings and bellies were found to be much more important in the escapement of haddock through the meshes than were the top wings and square.



The Service's research vessel Delaware.

Phase three was divided into three series of simultaneous tows with the standard 5-inch mesh #41 net of the Delaware and the $2\frac{1}{2}$ -inch mesh #41 net of the Albatross III. Sections of $2\frac{1}{2}$ inch mesh were replaced by 5-inch mesh to determine escapement from various sections of the net. Both nets had $2\frac{7}{8}$ -inch cod ends. The following groups of tows were made:

- a. Seven simultaneous tows with the complete $2\frac{1}{2}$ -inch mesh
- b. Four simultaneous tows of the $2\frac{1}{3}$ inch mesh trawl with 5inch lower wings.
- c. Four simultaneous tows of the $2\frac{1}{2}$ -inch mesh trawl with 5inch lower wings, top belly, and lower belly.

The catches are summarized for each net for the three series of tows in the following table:

Length of		a.			b.			С.		
Fish by	Percentage					Percentage		Percentag		
	No. of	Fish	Delaware	No. of	Fish	Delaware	No. of	Fish	Delaware	
3-cm. Groups	Albatross	Delaware	of Albatross	Albatross	Delaware	of Albatross	Albatross	Delaware	of Albatross	
18 & 21	68	8	12	25	. 9	35	39	40	103	
24	951	318	33	370	227	61	218	324	149	
27	3,541	1,705	48	1,733	1,508	87	1,205	1,403	117	
30	3,041	1,801	59	1,736	1,798	104	1,355	1,941	143	
33	780	319	41	508	548	108	477	628	132	
36	734	576	78	459	663	144	926	748	81	
39	972	1,069	110	563	832	148	1,193	1,109	93	
42	515	770	150	311	505	162	803	859	107	
45	141	241	171	104	206	198	229	336	147	
48	27	52	193	21	31	148	95	94	99	
51 to 66	20	66	330	38	30	79	92	61	66	
Totals	10,790	7,185	-	5,869	6,357	-	6,632	7.543	~	

The 5-inch mesh used in the forward parts of the trawl averaged about $4\frac{3}{4}$ inches. internal measurement. The $2\frac{1}{2}$ -inch mesh averaged $2\frac{1}{2}$ inches, internally. The $2\frac{7}{8}$ inch cod ends averaged $2\frac{1}{2}$ inches internally.

The results show that many small-size haddock escape through the lower wings and bellies. The top wing and square appear to be unimportant for the escapement of haddock. Smaller catches of larger fish were made with the 2½-inch trawl, indicating that the small-mesh net was not fishing as effectively as the 5-inch trawl.

In addition to the 64 simultaneous tows made by the two vessels, the Albatross III made 53 additional tows, comprising phases 4, 5, and 6 of the Albatross III operations.

In phase four alternate tows were made by the Albatross III with complete $2\frac{1}{2}$ inch mesh and 5-inch mesh #41 trawls to compare alternate tow and simultan-

		Number	of Fish
Lengths of Fish by 3-in. Groups	$2\frac{1}{2}$ -in. Trawl	5-in. Trawl	Percentage 5-in. Trawl of $2\frac{1}{2}$ -in. Trawl
15 - 21	89	69	78
24	220	165	75
27	424	360	85
30	350	464	132
33	453	391	86
36	791	777	93
39	777	825	106
42	479	565	118
45	302	400	132
48	232	225	97
51 - 75	372	393	106
Total	4,489	4,634	-

eous tow (phase three) methods. Both nets had $2\frac{7}{8}$ -inch cod ends. The pairs of alternate tows gave widely varying results, as was expected. A summary of catches by the $2\frac{1}{2}$ -inch and 5-inch trawls is given in the table.

Although extreme tow-totow variations caused results to be less reliable than the simultaneous tow data, it is shown that escapement takes place through the forward parts of the net.

Phase five was conducted to determine which part of the cod end was most effective for the

escapement of haddock. The forward parts of the net were therefore unchanged during phase five, which consisted of four series of tows with a $4\frac{3}{4}$ -inch (internal size) double-manila cod end with cover arranged as follows:

- a. Covering the full length of the cod end (44 meshes).
- b. Covering the after 22 meshes of the cod end.
- c. Covering the after 16 meshes of the cod end.
- d. Covering the after 11 meshes of the cod end.

The 50-percent point of the $4\frac{3}{4}$ -inch cod end with full cover (a. -9 tows) was about 36 cm. This was 3 cm. lower than would be expected, due to certain characteristics of the

twine.	Length of	Number of		Percentage Re-	Percentage Re-
	Fish by	Fis	h in	tained in Wire-	
With the cov-	3-in. Group	Cover	Cod End	Mesh Cod End	ard 28-in. Cod End
er over the after	18	5	-0	0	4
22 meshes (b	21	40	16	29	18
4 tows) and the	24	87	43	33	43
after 16 meshes	27	47	77	62	79
(c2 tows), the	30	5	58	92	97
50 percent point	33	1	107	99	99
was unchanged.	36 - 54	0	331	100	100
When moved down	Total	185	632	-	-
to cover only the					,

after 11 meshes (d. -- 3 tows) the 50 percent point was lowered to about 34.5 cm.

It was thus demonstrated that most escapement takes place in the after quarter of the cod end under loads up to 2,000 pounds.

Phase six was conducted to determine if sharper selection could be obtained by using a cod end of rigid wire netting in which only slight variation in mesh size existed. A 7-foot long section of the wire mesh was put into the cod end from laceage to laceage in the effective escape area (near the after end) of a 24-inch mesh covered cod end. The wire was of diamond shape, measuring $2\frac{7}{8}$ inches in length and $2\frac{5}{8}$ inches in width. The number of fish caught in the wire-mesh cod end and cover are shown in the table.

The percentages retained are shown in comparison with the percentage retention of a standard double-manila cod end of approximately equivalent size. The wire-mesh cod end shows rather duller selection than a standard manila cod end.

* * * * *

MIDWATER TRAWLING BY M/V "DELAWARE" FROM GEORGES BANK TO PIERRE BANK YIELDS NO FISH (Cruise 24 and 25): Experimental midwater trawling by the exploratory fishing vessel M/V Delaware in an area from Georges Bank to St. Pierre Bank yielded no commercial quantities of ocean perch. During the two cruises (cruise 24--5 days; cruise 25--16 days), 32 tows in the midwater area from near the surface to depths of 228 fathoms failed to produce fish though indications were that the Service's nylon and manila midwater trawls were working satisfactorily.

During the cruises considerable time was spent searching for midwater schools of fish, but no indications of fish in midwater were obtained by the two electronic fish-finding devices installed aboard the <u>Delaware</u>. Previous experience has shown that unless the echo-sounding or fish-finding devices record concentrations of fish or other marine life in the midwater areas, the chances for successful catches in midwater are very slight.

On three short tows the midwater trawl was intentionally set on the bottom. One tow caught 350 pounds of ocean perch and a few cod and gray sole. Midwater

trawling in the same area during day and night yielded no ocean perch. Two other bottom sets caught small quantities of northern shrimp (Pandalus borealis).

Two midwater trawls of different designs were used during the cruises. One, an all-nylon net of $4\frac{1}{2}$ -inch mesh in the wings, 3-inch mesh in the cod end, and a 50-foot square mouth opening. The second net, all manila, 6-inch mesh wings, 3-inch mesh in the cod end, and a 65-foot square mouth opening. Sidesetting midwater trawl gear presented problems, but after



M/V Delaware Cruise 25 (Aug. 13-Sept. 6, 1956).

modifications of the net and doors the gear was operated successfully.

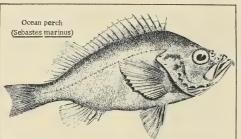
The electronic depth telemeter was used on all midwater tows and allowed for accurate depth-positioning of the midwater net. This prototype instrument developed for the Service by the University of Miami Marine Laboratory has proved to be very serviceable.

Deep-water exploratory trawling for ocean perch along the edge of the continental shelf south of Georges Bank was to be the objective of the <u>Delaware</u> during an 11-day trip scheduled to begin September 25, 1956. The area from 100 to 300 fathoms will be explored by the <u>Delaware</u>, principally in locations where possible commercial concentrations of ocean perch were indicated during recent cruises for deep-water lobster. Two types of nets were to be used, a standard #41 and a "balloon" trawl. Several tows were to be made using a 16-tooth rocking chair-type dredge in the shallower areas of Georges Bank as limited preliminary exploratory work on the commercial possibilities of an offshore shellfish resource.



North Atlantic Fisheries Investigations

BIOLOGISTS TAG FIRST OCEAN PERCH: Due to a strange occurrence of deep-sea ocean perch near the surface at Eastport, Me., biologists from the Woods Hole Laboratory of the U. S. Fish and Wildlife Service were able to initiate a successful



tagging program early in August. Numbered plastic discs were inserted on the cheekbones of 317 fish in the first phase of the program.

Ocean perch normally occur in depths of 40-200 fathoms, and are fatally bloated when brought to the surface as a result of the extreme change in pressure. Consequently, no fish can be tagged which are caught by commercial trawlers. The biologists have been considering various schemes for tagging the fish without bringing them to the

surface, such as the use of detachable marked hooks. Before embarking on a program involving complicated procedures, however, they decided to investigate persistent rumors that ocean perch occur near the surface in late summer at Eastport, Me.

A check at this locality revealed hundreds of ocean perch feeding at or near the surface on the small pelagic shrimp <u>Meganyctiphanes</u>. In three days of hook-and-line fishing 317 fish were tagged. The fish were in excellent condition when released and were at or near commercial size so there is every reason to believe some recoveries will be made provided this stock of fish moves into commercial fishing grounds later in the year. The biologists will continue their work until thousands of fish have been tagged.

Fishermen are urged to look for tagged ocean perch. The tag is a brilliant yellow disc pinned through the gill cover on the left side of the fish. The fish as well as the tag should be saved if possible. Any Fish and Wildlife agent may be notified upon capture of such a fish. A reward will be paid.

Recoveries of marked fish will provide important information on the growth rate, mortality rates, and migrations of this valuable food fish in the North Atlantic.

MATERIALS FOR GROUNDFISH FOOD HABITS STUDY COLLECTED BY M/V "ALBATROSS III" (Cruise 80): To collect materials on Georges Bank for a study of the benthic fauna and the food habits of groundfish was

the benthic fauna and the food habits of groundfish was the purpose of cruise 80 (August 9-17) of the Service's research vessel <u>Albatross</u> <u>III</u>.

Bottom fauna samples and stomachs from groundfish were obtained at seven widely-spaced locations on or adjacent to Georges Bank. The areas represented were: Southwest Part, Southeast Part, Northeast Peak, Northern Edge, Central Georges, Georges Basin, and South Channel. Fish were taken with a No. 36 otter trawl fitted with a $\frac{1}{2}$ -inch (expansion measure) mesh liner. Haddock, cod, butterfish, whiting, herring, and red hake were the principal species caught. A few specimens of 13 other species were taken. Stomachs from all species were dissected out and retained for study.



Service's research vessel Albatross III.

The sedentary and slow-moving bottom organisms were taken by means of the Smith Sampler, Digby scallop drag fitted with a fine mesh liner, and a sled-mounted ring net. All collections were preserved and brought to the laboratory for analysis.

The analysis of these samples will be made to determine whether or not haddock are selective in their feeding and to determine the relationship of food organisms to the distribution of haddock.

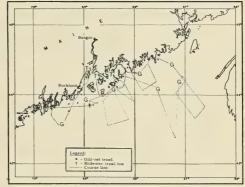
The vessel's next cruise will start September 14. On this trip the 1956 survey will be made to determine the extent and distribution of the new haddock year-class (1956) on the bottom.



North Atlantic Herring Research

COASTAL WATERS OF EASTERN GULF OF MAINE EXPLORED FOR HERRING BY M/V "METACOMET" (Cruise 5): Scouting and fishing the coastal waters of the eastern part of the Gulf of Maine to learn if herring (particularly of sardine size) were present at this time was the principal purpose of Cruise 5 (August 1-10, 1956) of the M/V Metacomet, a Fish and Wildlife Service chartered exploratory fishing vessel.

Results of the cruise were largely negative. Only very small catches of herring were made in herring gill nets. Three different methods of setting gill nets were used: (1) "anchored sink gill nets" set on the ocean bottom; (2) "anchored floating gill nets" which were suspended 12 feet deep from large surface floats but held in a fixed position by anchors at each end; and (3) "drift gill nets" which were suspended 12 feet deep from surface floats, drifting freely during the night with one end attached to the drifting Metacomet. Herring brit were located on the depth-sounder and sampled in



Cruise 5 of Fish and Wildlife Service chartered vessel Metacomet.

Blue Hill Bay and Penobscot Bay on August 8 and 9 when weather prevented setting gill nets in outside waters.

Cruise No. 6 of the <u>Metacomet</u> was scheduled for August 17 through 27. The objective is to make a thorough survey of the inside waters along the Coast of Maine from Passamaquoddy Bay to Casco Bay for 0-year-class herring "brit" which may become available as sardines during the autumn months. The depth-sounder will be used to locate fish and midwater trawl gear will be used for fishing.



North Pacific Exploratory Fishery Program

ALBACORE TUNA AND SALMON DISTRIBUTION IN OFFSHORE WATERS STUDIED BY "JOHN N. COBB" (Cruise 28): Distribution of albacore tuna and salmon in offshore waters from northern California to southern British Columbia was investigated during a 7-week cruise by the Service's exploratory fishing vessel John

N. Cobb, which returned to Seattle on August 30.



The Service's research vessel John N. Cobb.

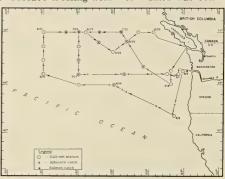
Results of the exploratory fishing with surface gill nets and trolling gear showed that albacore were widely distributed off Oregon and Washington from 80 to 600 miles offshore. Salmon were caught offshore only at four gill-net stations along 50° N. latitude, and none were taken south of this line except for one silver salmon caught on albacore trolling gear about 20 miles off the Columbia River. No albacore were caught north of 49 06' N. latitude.

Following a prearranged sched-

ule to insure adequate coverage of the area, the vessel completed 27 nighttime gill-net stations out to 145° W. longitude, over 800 miles offshore. The standard set was 900 fathoms of nylon gill net with mesh sizes from $3\frac{1}{4}$ to $8\frac{1}{2}$ inches. Surface trolling with 6 or 7 lines was con-

ducted during daylight hours while running between stations. Significant fishing results were transmitted to the fishing fleet by radio.

A total of 63 albacore were caught, 38 on trolling gear and 25 in the gill nets. Individual catches were small during the entire cruise, indicating that no sizable concentrations of either albacore or salmon were available at the time in the waters fished. No schools of either species were seen. The first catch of albacore was made in gill nets July 20 near the Seamount about 270 miles west of Grays Harbor. Best albacore catches were made on July 29 when nine fish were taken trolling near 46° N., 134° W. and nine were



M/V John N. Cobb, Cruise 28 (July 16-August 30, 1956).

caught in the gill nets that night about 20 miles eastward. Five red salmon and two silver salmon were caught at four of the northernmost gill-net stations. One steelhead trout was taken along with 2 red salmon in the gill nets on July 22 at 50° N., 133° 58' W.

Several other species of fish, mostly jack mackerel, pomfret, and blue shark were present in most gill-net catches. Up to 206 pomfret, 148 jack mackerel, and 31 blue shark were taken in individual catches. On July 27, the gill nets caught 97 large squid from $2\frac{1}{2}$ to 3 feet in length at 46° N., 140° W. Night-light fishing produced numbers of small squid, saury, and lantern fish, all important items of albacore food in these waters.

The <u>John N. Cobb's</u> work was coordinated with a cruise of the University of Washington's oceanographic research vessel <u>Brown Bear</u>, and the two vessels worked in close conjunction much of the time. Simultaneously the <u>John R. Manning from the Pacific Oceanic Fisheries Investigations conducted albacore research west of 145 $^{\circ}$ W. longitude, adjoining the area covered by the <u>John N. Cobb</u>. Oceanographic and biological data will be compared with the fishing results to learn as much as possible of the movements and other habits of albacore, how they are affected by changes in the ocean, and why their availability to the fishermen fluctuates so greatly.</u>

Following the early albacore catches by the \underline{John} \underline{N} . \underline{Cobb} and the \underline{Brown} \underline{Bear} , the commercial fleet in mid-August found schools of albacore close-in to the \underline{Ore} gon coast, and good fishing was reported by a number of vessels. This is the first year since 1950 that any appreciable numbers of albacore have been caught north of California.



Oysters

SUMMER 1956 SET IN CHESAPEAKE BAY AREA: Each season records of the time and intensity of oyster setting and of the attachment of fouling organisms in certain areas are obtained by the Chesapeake Biological Laboratory of Maryland's Department of Research and Education, through exposure of test shells. Experience has shown that hardly ever does the first oyster spat of the season appear before the first of June and none have been recorded later than

the month of October. Hence, at most stations where the time and setting rate of spat are measured, shells are exposed only during the above period.

A few scattered spat were attached to shells at most stations during the first part of this summer. Usually a peak of setting occurs in certain areas in late June or July, sometimes followed by one or more later peaks. At some stations, especially in the Solomons area, the light set occurs most often during the fall. St. Marys River, the upper Honga River, both sides of the Bay just above Solomons, and the Patuxent River all had received only a few scattered spat this year from early June to mid-July although the first named areas usually have good accumulations by that time. Scattered data indicate that little set occurred during this same period in Holland Straits and Piney Island Swash. Smith Creek, however, produced a fair set during the week of June 28-July 5 that amounted to about 10 spat per shell face. This rate of setting had diminished to very few spat during mid-July.

Fertilized Fegg Young Larvae

Mature larvae just before setting

Oyster spat 5 hours after attachment

Even an initial set of ten or more spat per shell face at an age of one week does not insure that many will survive the perils of a microscopic oyster's early life.

Shells that have been planted for a longer period prior to the set may also be quite foul and so offer little suitable space for spat attachment. Of course, when only a few spat attach initially, the number of surviving set must remain small. Typically, light sets, such as have occurred so far this season, show a much better rate of survival than do more densely-crowded sets. It is still too early to predict just how successful this season's oyster set may be, for later peaks of more intensive setting may occur. Only Smith Creek so far has had enough potential spat-fall to produce a good crop if commercially planted shells were clean and the rate of survival high.

While the amount of spat found on clean test shells exposed each week does not give an accurate picture of the crop to be found on commercially-planted shells by late fall, it does offer a means of getting the maximum possible attachment from the set that occurs. Experiments have shown that shells planted just prior to a peak of oyster setting sometimes may obtain two or more times as many spat as shells that have been overboard for several weeks prior to the set. This is due to the shell's cleaner surfaces at the time of spat-fall. In some areas a heavy wave of barnacle setting often occurs in late spring or even in early June that can render shells almost useless for spat attachment when the oyster set occurs.

A number of years of observation in a given area sometimes may reveal a rather consistent pattern of oyster setting so that a normal date can be picked when shell planting may be done only a short time before the oyster setting peak is most likely to occur. Observations by test shells also may reveal places that seldom obtain significant sets at any season and others that usually produce a high rate of setting. Some use of such observations has been made in shell planting, but in large-scale operations it is not always possible to get all of the shells over at the optimum time even when this is fairly well designated, the July-August 1956 Maryland Tidewater News points out.

South Atlantic Exploratory Fishery Program

ROUND-THE-CLOCK TRAWLING BY M/V "COMBAT YIELDS EXCELLENT CATCHES OF RED SHRIMP (Cruise 4): Round-the-clock trawling by the M/V Combat off St. Augustine in depths of 175 to 210 fathoms yielded excellent catches of



M/V Combat chartered for South Atlantic Fisheries Exploration.

deep-water red shrimp ($\underline{\underline{Hymeno-penaeus}}$ robustus). A total of 4,200 pounds of heads-on shrimp (21 boxes, headless) were caught in 16 drags, using a 40-foot flat trawl. Twenty-two drags of 3- to 4-hour duration were made during a $4\frac{1}{2}$ -day fishing period. Six of these tows failed to reach bottom, and no catch was made.

The M/V Combat, a 96-foot wood hull shrimp vessel powered

with a 500-hp. Diesel engine, was chartered by the U.S. Fish and Wildlife Service in July for continuation of offshore shrimp exploration along the South Atlantic coast initiated by the chartered vessel Pelican in March 1956. The Combat is rigged with a large heavy-duty winch, stern davits, and is equipped with immersion-type shrimp-freezing apparatus.

First successful attempts to trawl in deep water against the Gulf Stream current were made during a 6-day shakedown cruise, July 26-31, on smooth bottom southeast of St. Augustine. Ground speeds of 2.5 to 3.5 knots were determined to produce the best fishing results while towing countercurrent. A minimum ground speed of 4 to 4.5 knots can be obtained towing with the current.

The subsequent round-the-clock fishing (August 6-11) was confined to an area off St. Augustine where previous work by the M/V Pelican revealed promising concentrations of red shrimp. Drags were alternately run with the current and countercurrent. The best catch yielded 560 pounds of shrimp, from a 4-hour countercurrent drag. The remaining 15 successful drags caught from 200 to 450 pounds of heads-on shrimp. The catch averaged 25 count headless.

Highest concentrations were found immediately below 29° 58.5' north latitude, in 175 to 190 fathoms. To the north of this point rock and coral bottom constitute a major trawling hazard.

The Combat is scheduled to depart Jacksonville on August 14 to continue fishing operations in the same general area. During this trip 80-foot balloon trawls will be used to obtain information on potential commercial catch rates. Also, a series of exploratory drags will be made between the 10- and 50-fathom curves southeast of Mayport, to determine the extent of offshore movement of brown shrimp stocks presently being fished in that area.

EXPERIMENTAL SHRIMP TRAWLING IN KEY WEST-TORTUGAS AREA BY "GEORGE M. BOWERS" (Cruise 6): Small amounts of pink shrimp (Penaeus duorarum) were taken fishing just off the bottom, and trace amounts in three midwater

tows by the Service's gear research vessel George M. Bowers during a 15-day experimental shrimp trawling cruise in the Key West-Tortugas area off southern Florida. The vessel, which completed its trip on August 30, made 50 drags of one to three hours with 40-foot and 20-foot flat trawls on the bottom, off the bottom, and in midwaters.

Ten drags fishing on the bottom among boats of the fleet in 11- to 20-fathom depths resulted in catches ranging from individual shrimp to 10 pounds (heads off) an hour. Fishing in the same area with the trawl rigged

to three pounds an hour.

Pink Shrimp (Penaeus duorarum) to fish $2-2\frac{1}{2}$ feet off the bottom resulted in catches ranging from individual shrimp

Fishing off the bottom was also conducted in bad bottom areas known as "The Loggerheads," in depths of 11 to 30 fathoms. Ten tows were completed in this area with catches ranging from individual shrimp to two pounds an hour. Larger individual shrimp were taken in the deeper waters (23 to 30 fathoms) with individuals ranging from 6 count to 20 count. On five additional tows quantities of sponge and invertebrates (to 200 pounds) were taken in bad bottom areas when the net touched bottom. Gear damage was slight.

A total of 25 tows were made with 40-foot and 20-foot trawls in midwaters at distances ranging from 2 to 5 fathoms above the bottom in depths ranging from 11 to 30 fathoms. One, two, and three individual pink shrimp (16-20 count, heads off) were taken on three tows with the trawl a calculated two fathoms above the bottom. These tows were made just northeast of Tortugas in 16 to 17 fathoms of water.

Two biologists from the University of Miami Marine Laboratory participated in the cruise for continuation of cooperative experiments with trawl savings gear, Studies are being conducted to test the survival of shrimp escaping through codend meshes in the Tortugas fishery. Shrimp caught in the cod-end cover bags were held in aquaria aboard the research vessel to determine extent of injury in escapement through meshes. Results of the tests will be announced by the Marine Laboratory when analysis has been completed.



South Carolina

OYSTER LAWS REVISED: Oyster law revisions by the last General Assembly of South Carolina present new opportunities for profit, while promoting the growth of the oyster industry, in the opinion of the Chairman of the State's Wildlife Resources Commission.

The new oyster code repealed 24 sections and amended 14 more into a compact 20-section body of law, points out the summer 1956 issue of <u>South Carolina Wildlife</u>.

Perhaps the most important features of the revision are these:

- 1. Owners and lessees of oyster bottoms are encouraged to improve their beds because the new law protects the oysters from public harvest. As the law stands now, an owner or lessee need only post his oyster beds as prescribed in the statute to make it illegal for persons to enter upon and harvest without authority. Penalties are provided for violations.
- 2. Formerly, the "two-bushel law" allowed anybody to take oysters freely even from private beds upon which owners or lessees had spent money and effort in propagation and cultivation. Now, the Wildlife Resources Commission (through the Division of Commercial Fisheries) is directed to establish and maintain "oyster farms" in each of the six coastal counties. From these beds the public will be entitled to gather oysters free for their own use.
- 3. Seed oyster production, made legal by the new law, should become profitable rapidly for two reasons. One is that seed oysters may be grown on beds now barred to use because of pollution. Seed oysters must be taken up and transferred to other beds by the time they are $1\frac{1}{2}$ inches long. Thus, they will cleanse themselves long before they reach marketable size. Oyster shores, especially around Charleston and Beaufort, have been seriously curtailed by pollution. This will put them back to profitable work. Moreover, there is a serious and growing need for new seed oyster sources for Chesapeake Bay and Long Island waters. South Carolina is capable of producing two crops of seed oysters every year.
- ${\it 4.} \ \ \, \text{The rights of landowners adjacent to oyster beds not under lease to preference} \\ \text{in leasing now is limited to two acres each}. \\ \ \, \text{Formerly, there was no limit specified}.$
- $5\,.\,$ A new leasing right up to four acres was instituted for persons or corporations not engaged in commercial oyster culture.
- 6. Lessees must show by the end of three years that they have "Effectively cultivated the area or face forfeiture of the lease, after due notice and a hearing."



Tuna

ALBACORE BEING SOUGHT OFF OREGON-WASHINGTON COAST: "We ran into some fish but not in concentrations heavy enough to support a commercial fishery," reported one of the two Oregon Fish Commission biologists who have been aboard the Brown Bear, University of Washington oceanographic research vessel, for the past three weeks in a large-scale search for albacore tuna off the Oregon-Washington coast. The Brown Bear and a companion vessel, the John N. Cobb, exploratory fishing vessel operated by the U.S. Fish and Wildlife Service, were in Astoria on August 3 for a brief pause in a seven-week hunt for albacore and facts that may influence the distribution of these fish in Northwest offshore waters.

In all, 72 albacore were caught by the two ships during this first phase of the cruise-28 by the Brown Bear and 44 by the John N. Cobb. All fish caught by the Brown Bear were taken on feathered jigs, but the John N. Cobb took 20 tuna with gill nets. Most of the albacore were caught from $300\ to\ 400$ miles offshore. When albacore supported a substantial commercial fishery off Oregon between 1938 and 1950, the fish were caught in large numbers as close as 50 miles off the coast. Oregon's albacore catch hit a peak of 22.5 million pounds in 1944.

The Fish Commission biologist said food fish and plankton utilized by albacore were fairly abundant but were found in widely scattered groups. Considerable numbers of mackerel-like sauries, regarded by biologists as a prime item on the albacore menu, were sighted during the cruise.

Both vessels departed from Astoria August 6 for the second lap of the investigation in open waters off southern Oregon and northern California. The prospects for locating larger schools of albacore appear to be better for this leg of the trip because:



- Another U. S. Fish and Wildlife Service research vessel, the <u>John R</u>. Manning, caught over 30 albacore in the general vicinity last year.
- 2. The <u>Brown Bear</u> and the <u>John N. Cobb</u> will be fishing in waters closer to areas where albacore are regularly taken in commercial quantities.
- 3. Biggest albacore catches were made in August when a fishery existed off Oregon and Washington.

The research vessels plan to continue to maintain radio contact with commercial fishing vessels and relay any news of sizable schools of albacore that might be encountered. A total of over 3,500 miles will be covered during this summer's albacore investigation which has been coordinated by the Pacific Marine Fisheries Commission.



United States Fishing Fleet Additions

JULY 1956: First documents as fishing craft were issued for 68 vessels of 5 net tons and over during July 1956, according to the Bureau of Customs. This was 15 vessels more than for the same month of 1955. The Chesapeake Bay States led

Γable 1 - U. S. Vessels Issued First Documents As					ents As	Table 2 - U.S. Vessels I.	ssued	
Fishing Craft, by Ar	Fishing Craft, by Areas, July 1956 and Comparisons				First Documents as			
Area	July		Jan.	Jan, -July Total		Fishing Craft, by Tonnage,		
Area	1956	1955	1956	1955	1955	July 1956		
		(Number)				Net Tons	No.	
New England	1	5	10	15	18	5 to 9	31	
Middle Atlantic	4	-	19	. 9	13	10 to 19	14	
Chesapeake	23	3	66	27	54	20 to 29	8	
South Atlantic	12	10	61	40	65	30 to 39	3	
Gulf	10	7	65	55	103	50 to 59	2	
Pacific	14	26	62	86	117	100 to 109	1	
Great Lakes	-	-	2	5	9	110 to 119	1	
Alaska	4	2	31	25	35	120 to 129	4	
Hawaii	-	-	-	2	3	130 to 139	1	
Virgin Islands		-	-	-	1	150 to 159	2	
Total	68	53	316	264	418	180 to 189	1	
Note: Vessels assigned to the	lote: Vessels assigned to the various sections on the basis of their home port						68	

^{1/} Includes both commercial and sport fishing craft.

with 23 newly-documented craft, followed by the Pacific area with 14, the South Atlantic with 12, the Gulf with 10, and the Middle Atlantic area and Alaska with 4 each. New England was credited with 1 newly-documented vessel.

The Chesapeake Bay area showed the greatest increase in vessels issued first documents during July 1956 with 20 vessels more than were reported for July 1955. The South Atlantic and Gulf also had increases while the Pacific area showed a decrease of 54 percent as compared with the same month in 1955.

During the first seven months of 1956, a total of 316 vessels was documented for the first time as fishing craft--52 more than the number reported for the same period of 1955. This represents an increase of 20 percent.



U.S. Foreign Trade

EDIBLE FISHERY PRODUCTS, MAY-JUNE 1956: United States imports of edible fresh, frozen, and processed fish and shellfish in June rose 3.2 percent in quantity and 13.9 percent in value as compared with May 1956. Compared with June 1955

United States Foreign Trade in Edible Fishery Products, May-June 1956 with Comparisons										
	Quantity				Value					
Item	Ju		M.		Year	Ju		Ma		Year
					1955					
	(Millions of Lbs.) (Millions of \$)									
Imports:										
Fish & Shellfish:										
Fresh, frozen, & processed1/.	58.4	56,6	56.6	57.1	769.9	19.7	17.3	17.3	17.1	206.4
Exports:										
Fish & Shellfish:										
Processed 1/ only (exclud-										
ing fresh & frozen)	6.5	3.6	4.7	7.9	91.0	1.3	0.9	0.9	1.4	21.6
1/ Includes pastes, sauces, clam chowder and juice, and other specialties.										

the imports for June 1956 decreased 5.0 percent in quantity, but were 8.2 percent higher in value. June 1956 imports averaged 33.7 cents a pound as compared with 30.0 cents a pound for the same month in 1955 because there were

more imports of canned salmon, canned lobster and spiny lobster meat, and canned crab meat.

Imports of edible fresh, frozen, and processed fish and shellfish in May 1956 decreased about 15.5 percent in quantity and 2.3 percent in value as compared with April 1956. Compared with May 1955 the imports for May 1956 decreased one percent in quantity, but were 1.2 percent higher in value. The dollar value in May 1956 was close to 30.6 cents a pound, compared with 29.9 cents a pound in May 1955. The higher valuation in May 1956 compared with May 1955 was probably due to increases in the imports of canned salmon and crab meat which have a high dollar value.

Exports of processed fish and shellfish in June 1956 rose almost 38 percent above the previous month and 81 percent above the same month in 1955. The July 1956 value of these exports kept pace with the increase in quantity and went up 44 percent as compared with the previous month and the same month a year earlier. Increased exports of canned sardines were principally responsible for the spurt in processed fish and shellfish exports.

Exports of processed fish and shellfish in May 1956 increased about 24 percent from the April 1956 total, but were down 41 percent from May 1955. The value of exports in May 1956 increased 13 percent when compared with April 1956 but was 36 percent below May 1955.

* * * * *

GROUNDFISH FILLET IMPORTS DROP 6 PERCENT IN AUGUST: Imports of groundfish (including ocean perch) fillets during August 1956 of 11.3 million pounds were 6 percent less than the 12.0 million pounds imported during the corresponding month of last year. The drop, which was caused primarily by less imports from Canada, offset the 1.7-million-pound increase from Iceland. Imports from Denmark, the Netherlands, West Germany and Miquelon and St. Pierre were also somewhat larger.

Canada continued to lead all other countries exporting groundfish fillets to the United States with 8.6 million pounds during August 1956--76 percent of the total groundfish fillet imports during the month.

Total groundfish and ocean perch fillet imports into the United States during the first eight months of 1956 amounted to 93.9 million pounds as compared with 87.3 million pounds during the same period of 1955. Canada, with 68.1 million, led all other countries exporting fillets to this country during that period, followed by Iceland (17.4 million pounds), and West Germany (1.7 million pounds).

Note: See Chart 7 in this issue.

* * * * *

IMPORTS AND EXPORTS OF SELECTED FISHERY PRODUCTS, JANUARY-JUNE 1956: Fresh and frozen tuna imports for the first six months of 1956 totaled 67.1 million pounds, 8 million pounds less than in the same period of 1955. Alba-

core tuna imports during this period amounted to 20.7 million pounds as compared with 34 million pounds in the first six months of 1955. "Other tuna" imports



totaled 46.6 million pounds, a gain of 5.3 million pounds over the same period in 1955. This year Japan shipped in considerably more frozen "other tuna" than last year, while Peru shipped in substantially less.

Canned tuna imports for the first six months of 1956 reached 18.2 million pounds, about 4.3 million pounds more than in that period of 1955. Canned bonito imports of 8.2 million pounds during the first six months of 1956 were 1 million pounds less than in the same period of 1955.

Canned salmon imports during January-June 1956 totaled 11.1 million pounds while in the first six months of 1955 only 1.2 million pounds were imported.

Canned sardine imports for the first six months this year totaled 9.1 million pounds as compared with 10.4 million in the comparable period of 1955.

Fresh and frozen salmon imports for the first six months of 1956 amounted to 2.4 million pounds, 3.1 million pounds below the same period of a year ago.

Shrimp imports (fresh, frozen, canned, and dried) for the first six months of 1956 amounted to 31.9 million pounds, an increase of 11 million pounds over the same 1955 period. Imports from Mexico, Panama, Ecuador, and Japan were up.

Fresh and frozen lobster and spiny lobster imports for the first six months of 1956 amounted to 27.8 million pounds as compared with 26.9 million pounds for the same period a year earlier. Canned lobster imports for the first six months of 1956 of 1.8 million pounds were less than the 2.0 million pounds imported in the same period of 1955.

Canned crab meat imports for the six months of 1956 of 2.6 million pounds were almost a million pounds greater than for that period of 1955.

Groundfish fillet (including blocks and slabs) imports for the first six months of 1956 amounted to 63.4 million pounds, compared with 61.4 million pounds for the similar period a year ago. Of the total, fillet blocks and slabs imported during the first six months of 1956 amounted to 15.4 million pounds, over 10 million pounds less than for the like period of 1955.

Other fillets than groundfish imported during the first six months of 1956 totaled 29.3 million pounds, compared with 27.5 million pounds in the 1955 period with the principal gain in flounder and fresh-water fish fillets.

Fish meal imports January through June 1956 reached 59,726 tons as compared with 55,267 tons for the comparable period of 1955.

Canned salmon exports for the first six months of 1956 were 0.7 million pounds as compared with 4.4 million pounds in that period of 1955.

Canned sardine exports for the first six months of 1956 reached 22.7 million pounds, a gain of 2.4 million pounds over the similar period of 1955.

Fish oil exports January through June 1956 of 63.1 million pounds were much greater than the 46.0 million pounds in the like period of 1955.



Wholesale Prices, August 1956

Landings of fish and shellfish in August 1956 were at about the same level as the previous month, but demand was only light to moderate in spite of the cool weather which prevailed in most marketing areas. Higher wholesale prices during the month for fresh dressed finfish were offset by lower prices for fresh and frozen processed and canned fishery products. The August 1956 over-all wholesale index (114.6)



General view of one of the sheds in Fulton Fish Market, New York City on a Friday morning after most of the selling activity is over. Barrels in foreground are ready for loading and shipping out.

percent of the 1947-49 average) for all edible fish and shellfish (fresh, frozen, and canned) was the same as the previous month, but 2.6 percent higher than in the same month in 1955.

Fresh fish landings, which were light in July, continued light in August in most fishing areas. All drawn, dressed, or whole finfish items included in the index were priced substantially higher in August 1956 than in the previous month, particularly (1) fresh large drawn haddock because of lighter landings, (2) fresh dressed halibut because of

evenly-distributed landings on the West Coast and a good demand, and (3) freshking salmon because catches were light in the Pacific Northwest. Compared with the same month (hurricanes on East Coast) in 1955, wholesale prices this August for fresh drawn haddock were 39.5 percent lower at Boston and for whitefish were substantially lower at New York City and Chicago; but higher prices prevailed for fresh

halibut, fresh king salmon, and yellow pike at New York City, and lake trout at Chicago. The drawn, dressed, or whole finfish subgroup index in August 1956 was up 7.1 percent from the previous month, but down 4.0 percent from August 1955.

More plentiful supplies of small haddock were responsible for the drop in prices from July to August 1956 for fresh haddock fillets at Boston (down 13.6 percent) and fresh large shrimp at New York City (down 12.9 percent). Compared with August 1955, lower prices this August for fresh haddock fillets were more than

Table 1 - Wholesale Average Prices and Indexes for Edible Fish and Shellfish, August 1956 With Comparisons									
Group, Subgroup, and Item Specification	Point of Pricing	Unit	Avg. F	Prices1/		Indexes (1947-49=100)			
			Aug. 1956	July 1956	Aug. 1956	July 1956	June 1956	Aug. 1955	
ALL FISH & SHELLFISH (Fresh, Frozen, & Canned)					114,6	114.6	109.7	111.7	
Fresh & Frozen Fishery Products: Drawn, Dressed, or Whole Finfish:					126.5 131.2	125.9 122.5	117.5 106.3	119.7 136.6	
Haddock, Ige., offshore, drawn, fresh	Boston	lb.	.10	.09	101.3	92.2	56.3	163.4	
Halibut, West., 20/80 lbs., drsd., fresh or froz.	New York	1b.	.44	.40	136.9	122.2	107.3	106.0	
Salmon, king, Ige, & med., drsd., fresh or froz.	New York	lb.	.66	.64	148.3	142.7	144.4	135.4	
Whitefish, L. Superior, drawn, fresh	Chicago	lb.	.49	.48	121.5	119.0	131.4	146.3	
Whitefish, L. Erie pound or gill net, rnd., fresh		1b.	.65	.65	131.4	131.4	139.5	171.8	
Lake trout, domestic, No. 1, drawn, fresh	Chicago	1b.	.60	.60	122.9	122.9	117.8	111.7	
Yellow pike, L. Michigan & Huron, rnd., fresh	New York	1b.	.55	.54	129.0	126.7	78.6	119.6	
Processed, Fresh (Fish & Shellfish):					122.2	128.6	127,7	107.3	
Fillets, haddock, sml., skins on, 20-lb. tins.	Boston	lb.	.29	.33	97.0	112,3	85,1	115.7	
Shrimp, lge. (26-30 count), headless, fresh	New York	lb.	.70	.80	110.2	126.4	129.3	98.0	
Oysters, shucked, standards	Norfolk	gal.	5.75	5,50	142.3	136,1	136,1	117.5	
Processed, Frozen (Fish & Shellfish):					114.5	117.7	112.1	99.3	
Fillets: Flounder, skinless, 1-lb. pkg	Boston	lb.	.40	.39	103.4	102.1	102.1	102.1	
Haddock, sml., skins on, 1-lb. pkg	Boston	1b.	.28	.28	86,3	86.3	86,3	84.7	
Ocean perch, skins on, 1-lb, pkg	Boston	1b.	.28	.27	110.8	109.8	110.8	108.8	
Shrimp, lge, (26-30 count), 5-lb, pkg	Chicago	lb.	.78	.82	120.4	126.6	116.1	94.1	
Canned Fishery Products:					97.7	98.7	98.7	100,3	
Salmon, pink, No.1 tall (16 oz.), 48 cans/cs Tuna, lt. meat, chunk, No. 1/2 tuna (6-1/2 oz.),	Seattle	cs.	22,65	22.65	120.0	120.0	120.0	109,6	
48 cans/cs	Los Angeles	cs.	10,60	10.60	76.4	76,4	76,4	92.3	
48 cans/cs	Los Angeles	cs.	7,50	7,50	87.5	87,5	87.5	88,1	
Sardines, Maine, keyless oil, No. 1/4 drawn (3-1/4 oz.), 100 cans/cs.	New York	cs.	7,50	8,20	79.8	87.3	87.3	79,3	

L/Represent average prices for one day (Monday or Tuesday) during the week in which the 15th of the month occurs. These prices are published as indicators of movement and not necessarily absolute level. Daily Market News Service "Fishery Products Reports" should be referred to for actual prices.

offset by higher prices for fresh shrimp and shucked oysters. The index in August 1956 for the fresh processed fish and shellfish subgroup was 5.0 percent below the previous month, but 13.9 percent higher than in the same month of 1955.

Moderate stocks and a steady demand stabilized frozen fillet prices in August 1956 at almost the same level as the previous month, but they were somewhat higher than in the same month a year earlier. On the other hand, an increase in the supply of frozen shrimp and a slight drop in demand caused shrimp prices to drop from July to August this year. However, frozen shrimp prices at Chicago were still 27.9 percent above August 1955. The frozen processed fish and shellfish subgroup index for August 1956 was down 2.7 percent from the previous month, but rose 15.3 percent above the same month a year ago.

The only significant change in canned fishery products prices occurred in canned Maine sardines which dropped 3.6 percent from July to August with the entry of the new pack into the market. As of the end of August, the pack of Maine sardines was almost 50 percent greater than the pack a year ago when conditions were far below normal. With the salmon pack this season substantially better than last season, prices were strengthening although the index did not record a rise in mid-August. Compared with the same month in 1955, prices this August were 9.5 percent higher for canned pink salmon and 0.6 percent higher for canned Maine sardines, but 17.2 percent lower for canned light-meat chunk tuna and 0.7 percent lower for California tomato-packed sardines. The August 1956 subgroup index for canned fishery products was 1.0 percent lower than the previous month and 2.6 percent below the same month a year ago.



BOOM IN PREPARED FROZEN FOODS

Prepared frozen foods now constitute more than a third of all frozen foods marketed in the United States, after a remarkable increase of nearly 50 percent last year. Manufacturers of these convenience foods look for a further substantial increase this year-perhaps 35 percent oven the 1955 total.

Agricultural products have gained most in this relatively new field of merchandising, but the fishing industry has also chalked up an impressive record.



Fish sticks sprang into national prominence two years ago following in the path of breaded shrimp. Other prepared fish specialty items soon appeared in grocers' display cases.

Housewives welcome the freedom from unpleasant odors and waste and the certainty of well-prepared meals without suffering the drudgery of a hot kitchen. So they are buying more and more of the many fine items of prepared frozen foods.

What is behind all this

revolutionary change in marketing? The answer is advertising and promotion. Tempting color spreads in magazines arrest the attention and make fishery products ever so inviting, even to youngsters. Users of TV, radio, and newspaper advertising continually keep

their products' merits before the consumers.

Those who pack these new prepared frozen food specialties have assumed a heavy responsibility to the consuming public. Most packers show a keen sense of awareness to the need for adherence to highest quality levels to insure repeat business. Government-sponsored voluntary standards of quality for fish sticks, which recently became effective, promise to exert a strong stabilizing influence in the sales of this product.



International

U. N. INTERNATIONAL LAW COMMISSION

CONFERENCE ON LAW OF THE SEA PROPOSED: A recommendation proposing the convening of an international conference of plenipotentiaries to examine most aspects of the law of the sea, and to draw up appropriate instruments on the subject, has been made by the U. N. International Law Commission.

The proposal is contained in the Commission's annual report, which this year completes the 15-member body's work of codifying the law of the high seas and of the territorial sea, a vast and complex task upon which it has been engaged ever since its first session in 1949. In 1954, the General Assembly asked the Commission to finish its work on the subject in time for consideration by the Assembly in 1956

Among the questions dealt with in the 137-page report (Doc. A/CN.4/104) are: the breadth of the territorial sea; the "right of innocent passage," and the rights and duties of coastal states in that respect; the nationality of ships and whether there should be a special United Nations registration, entitling a vessel to fly the U. N. flag and to receive U. N. protection; penal jurisdiction in maritime collisions; the slave trade; pollution of the sea; and piracy, including piratical acts by aircraft, if these are directed against ships on the high seas.

Also included are revised sets of articles on fisheries and the conservation of the "living resources of the sea," and on the "continental shelf" and the right to explore and exploit its natural resources.

The proposal for calling an international conference is made in an introduction in which the Commission reaches the conclusion that this is the best way of giving "practical effect" to the rules it has formulated.

It recommends that the conference should be summoned by the Assembly, "to examine the law of the sea, taking account not only of the legal but also of the technical, biological, economic and political aspects of the problem, and to embody the results of its work in one or more international conventions, or such other instruments as it may deem appropriate."

The Commission goes on to express the belief that the conference should deal with all the different parts of the law of the sea covered in its present final report. Both its own experience, and the comments of governments, it says, have shown "that the various sections of the law of the sea hold together, and are so closely interdependent, that it would be extremely difficult to deal with only one part and leave the others aside."

The Commission adds that it considers the holding of the proposed conference "has been adequately prepared for" by its work to date. "The fact that there have been fairly substantial differences of opinion on certain points should not be regarded as a reason for putting off such a conference," it declares. In this connection,

it notes that there has been "widespread regret" that after The Hague Codification Conference of 1930, governments allowed "disagreement over the breadth of the territorial sea to dissuade them from any attempt at concluding a convention on the points on which agreement had been reached. " "The Commission," it says, "expresses the hope that this mistake will not be repeated."

The Commission itself expresses the belief that international law does not allow the breadth of the territorial sea to exceed 12 miles. Up to that limit, however, it commits itself to no specific decision, saying that it considers this should be taken by the proposed conference.

It notes that the right to fix the breadth of the territorial sea at three miles, often regarded as "the traditional limitation," is not disputed, but adds: "As regards the right to fix the limit at between three and up to 12 miles, the Commission was obliged to note that international practice was far from uniform. Since several states have established a breadth of between three and up to 12 miles, while others are not prepared to recognize such extensions, the Commission was unable to take a decision on the subject, and expressed the opinion that the question should be decided by an international conference of plenipotentiaries."

The 25 draft articles on the Territorial Sea include a section on the right of ships to innocent passage, which provides that "there must be no suspension of the innocent passage of foreign ships through straits normally used for international navigation between two parts of the high seas."

Defining the meaning of the phrase "innocent passage," the report says: "Passage is innocent so long as a ship does not use the territorial sea for committing any acts prejudicial to the security of the coastal state, or contrary to the present rules, or to other rules of international law.

FOOD AND AGRICULTURE ORGANIZATION

EDIBLE FISH MEALS: Edible fish meals are helping to provide increased nutrition in the diets of mothers and children in many countries, especially in tropical regions. Such refined fish meals and fish flours are particularly useful for their protein value, low price, and ease of

distribution and storage, while it is relatively easy to incorporate them in local traditional dishes and food preparations.

These are among the advantages claimed for fish meals specially refined for food, in a paper by the Nutrition Division of the Food and Agriculture Organization which was circulated during the recent Fish Processing Technologists Meeting at Rotterdam.



FAO is collaborating in the establishment of plants for the manufacture of edible fish meals and the United Nations children's welfare organization is urged to help governments to set up suitable plants.

Two types of potential consumers who would benefit from the supplementation of their diet with edible fish meals are those who prefer a mild, fresh-fish flavor or none at all--and those who prefer rather strong flavors, as they are used to consuming rather highly-flavored fish products such as fish pastes, sauces, etc., added to their otherwise rather bland diet, it is stated.

"In countries where the first of these preferences prevails, the fish meals to be introduced would resemble freshly dried or salted fish in taste and flavor, or they should be almost flavor-

less deodorized flours, which could conveniently be mixed with other foods such as bread flour.

"Where strong flavors are preferred deodorization or what may be called 'flavor refining,' would not be necessary. Any type of flour introduced should, however, resemble in its taste and flavor the local fish products to which people are accustomed."

Before an edible fish meal can be introduced into a specific area it is necessary to carry out "acceptability tests" to find out whether it can be added to local dishes and consumed over prolonged periods without becoming objectionable. During recent years FAO has helped to arrange a number of such tests.

Preliminary tests are carried out, covering a limited number of people, often members of the staff of a research laboratory, to eliminate the fish meals that have no chance of acceptance and to work out recipes for the fish meals that seem likely to be acceptable. Tests follow on a larger scale, usually involving 50 to 200 children, in which an "enriched" food preparation, containing fish meal is given daily over 1-2 months. In some instances edible fish meals have been used in hospitals to test their effect on children under treatment for protein malnurition.

"In general, the amounts of fish flour to be consumed daily by a child receiving fish flour as a protein-rich supplement may be from 10 to 15 grams (7 to 12 grams protein), comparable with 30 to 40 grams of skim milk powder (10 to 13 grams protein). These quantities of skim milk powder correspond with those provided in most U. N.-supported child-feeding programs.

To make fish meal suitable for human consumption it is necessary to eliminate fatty acids, peroxides, and other products to be found in some fish meals. Proper processing—in which high temperatures are avoided and exposure to air is mimirated—will prevent such changes to a large extent.

"The general bacterial count should be low, especially when the floures are consumed by children and, given normal processing this should not present difficulties. Deodorized fish flours can, if necessary, meet specifications calling for a total count of less than 2,000 bacteria per gram."

Fish meals to be used in supplementary feedings should have a protein content of not less than 65 to 70 digestibility coefficient and a high biological value. Relatively small quantities of fish meal protein with these characteristics can effectively supplement the proteins of the cereals which form the bulk of the diet of the poorer classes in many parts of the world.

"The fat content should preferably be low. Changes in Havor, and, in the case of deodorized meals, 'Havor reversion,' are mainly associated with the fatty constituent of fish meal preparations. Again, there is a slight possibility that harmful substances may be formed as a result of changes in the fat during processing and storage.

The price of fish meals must be low if they are to be of practical value as dietary supplements, it is stressed. It should be comparable, on a protein content basis, with that of dried skim milk. The manufacturing process must be such that the resulting product is of high nutritive value and harmless to the consumer. "It is essential that damage to amino acids should be avoided; this may easily occur if heating is prolonged."

"The paper goes on to give hints on the production of satisfactory nondeodorized edible fish meals. "Part of most of the fat present in the raw material must be removed, in accordance with the type of fish used for processing. "In many countries meals containing 4 to 8 percent of fat might be satisfactory from the public health standpoint, if they are made from fresh sound fish with effective sanitary control and are stored in airtight or almost airtight containers for not more than a few months before consumption.

"As low a fat content as economically practicable is, however, to be preferred. Fat can be removed by solvent extraction. Experience has shown that repeated and prolonged treatment with solvents such as petroleum, benzine, and ethyl alcohol does not change biological value and digestibility to any significant extent."

Deodorized fish flours can be most easily made by treating minced wet fish directly, and it is sometimes economical and convenient to use highgrade fodder fish meals as raw material for refining, if these are acceptable from the hygienic point of view. It is, however, more difficult to remove unacceptable flavors from fish meals than from wet fish.

A fish flour plant which is planned for Chile will manufacture almost flavorless fish flour obtained for part of the year from wet fish (hake) and during other seasons from first grade meal of the fodder type based on hake and manufactured under satisfactory hygienic control. Benzine and ethanol will be used for removing the fat and deodorization and a temperature above 100 degrees C. will be avoided during the extraction process. The process and equipment to be used will be by a Swiss company. Other promising deodorization processes in an advanced stage are a German process, and a South African process developed by the Fisheries Industries Research Institute of South Africa. A Corporation in the United States has originated a process which produces a partly deodorized product, it is stated.

As to cost, it is declared that acceptable non-deodorized fish meals and flours can be produced at 18 cents a pound or below.

"However, it is probably more realistic to assume a cost price per lb. for deodorized fish flour of something between 23-45 cents a pound. The term 'deodorized' should not be taken to imply complete freedom from fishy flavors, but rather a degree of treatment which makes the flour acceptable for addition to appropriate foods in the diet."

Education of consumers in the practical use of fish meals will be needed if sales of the products are to expand, and the products must be available at a reasonable price, while potential markets seem to be considerable, says the paper.

"Non-deodorized meals may gain a market more readily than deodorized meals, at least in certain countries, since in many respects they resemble traditional fish products to which consumers are already accustomed."

Regarding further work on edible fish meals, the paper adds that basic work needed to evaluate promising processes and products will be carried on by FAO, but the whole problem of producing and utilizing edible fish meals, especially deodorized meals, is still in an early stage.

"There is room for much further development. Detailed research is needed on the processes of flavor removal and 'flavor reversion,' and on the influence of what may be called 'temperature time effects,' and other procedures used in manufacture on the nutritive value of the final product. Here there are considerable gaps in knowledge. The cooperation of research institutes in investigations of these and other problems is needed."

INTERNATIONAL CONGRESS ON CANNED FOODS

The Third International Congress on Canned Foods, organized by the International Permanent Committee on Canned Foods, was held September 24-28, 1956, in Rome and on September 29-30 in Parma, Italy. At Parma the Congress members visited the 11th Canned Food and Packaging Fair and attended a conference on machinery and equipment for the canning industries.

The purpose of the Committee is to promote the advance of scientific, technical, and practical knowledge useful to the canned food industry, and to develop the consumption of canned foods.

Included among the many subjects in the program were the following of value to fisheries interests:

Under "Current Problems in Canning Technology" was included the canning of fish.

Under "Containers" were included (1) corrosion of tin plate; (2) use of electrolytic tin plate; (3) choice of cans for various products.

Under "Sanitation" was included waste problems in the fish-canning industry.

Under "Bacteriological Problems" were included preserved and semipreserved fish.

(NORTH EUROPEAN) INTERNATIONAL FISHERIES CONVENTION

FIFTH MEETING OF PERMANENT COMMISSION: The Fifth Meeting of the Permanent Commission set up under the (North European) International Fisheries Convention of 1946 took place in London between May 8-11, 1956. Delegations attended from all 13 of the Member Governments, namely, Belgium, Denmark, German Federal Republic, France, Iceland, Ireland, Netherlands, Norway, Poland, Portugal, Spain, Sweden, and the United Kingdom of Great Britain and Northern Ireland. Observers were present from the Union of Socialist Soviet Republics, which was represented for the first time.

Attending the meeting also were observers from the International Council for the Exploration of the Sea, the Food and Agriculture Organization of the United Nations, and the International Commission for the Northwest Atlantic Fisheries, states a May 28 United States Embassy dispatch from London.

Much of the Commission's discussion was devoted to the report of an $\underline{ad\ hoc}$ Scientific Committee set up at the previous meeting to review available information and to advise the Commission on minimum mesh sizes for nets and minimum size limits for fish, and to say whether any changes were required. The Commission recognized that this report, the conclusions of which were based upon all the scientific knowledge arrived at after many years of fisheries research, was a most

important and valuable document. The Commission resolved to provide for the publication of the report, and it was agreed to recommend that the Member Governments should have the report translated for the information of their fishermen; should seek the views of their own fishing industries; and should report back with their recommendations and proposals by December 31, 1956. These will be taken into consideration, with the main report, at the next meeting. It was decided that in the meantime the 75-mm. (2.95-inch) minimum mesh for ordinary trawl nets should be continued for another year until April 4, 1958.

The Commission also gave further attention to the problem of mixed fishing for protected and for other species. The Commission appointed a Committee composed of representatives of the six countries most concerned (i.e. Belgium, France, Netherlands, Federal German Republic, Poland, and Sweden) to study this problem further for the next meeting.

Arrangements for insuring the uniform enforcement of the provisions of the Convention were again discussed. A committee of the Commission examined the reports of infractions submitted by all Member Governments and the Commission unanimously agreed to recommend to Member Governments suggestions designed to make more uniform enforcement possible. The Commission expressed its thanks to the Netherlands Government for making available an officer for the Commission's employment to visit those Member Countries which might so desire in order to advise upon the enforcement of the Provisions of the Convention.

Finally, the Commission received reports from the International Council for the Exploration of the Sea on the question of a definition of the light trawl, and the problem presented by the capture of undersized whiting in the industrial fisheries. The Commission decided to take no further action at present on these problems since the International Council was still continuing its investigations.

The Commission will hold its next meeting in London beginning on May 14, 1957.

MEDITERRANEAN FISHERIES COUNCIL

PROPOSES INVESTIGATION OF MEDITERRANEAN FISH MIGRATIONS: Renewed efforts to investigate the age-old riddle of the migrations and movements of fish in the Mediterranean, which have baffled man since the Phoenicians caught tuna along its shores, will be made if plans proposed by the General Fisheries Council for the Mediterranean are put into successful operation, a Food and Agriculture Organization news release of August 1956 points out.

The Secretary of the Council states: "The Council is promoting an ambitious program of investigation, depending, of course, on the help and cooperation of interested nations, which will entail the study of fish populations in the Mediterranean, the migrations and life cycles of various species of fish, a study of Mediterranean trawling grounds, and the accummulation of other knowledge which we hope will, in the long run, fit into place like pieces of a jigsaw puzzle, and give us a comprehensive view of fish stocks in the Mediterranean.

"It is a strange but true fact that although man has been fishing in the Mediterranean for thousands of years, we are to a great extent ignorant of what happens to some of the most important species of commercial fish. For example, we know that tuna appear in certain parts of the Mediterranean at certain times of the year, as they have done since the days of Nineveh and Tyre. Fishermen are able to fish them for only a few months then they completely disappear for the rest of the year.

"There have been, of course, many interesting theories as to where they go to but nobody has so far been able to clear up the mystery. We are faced with similar riddles in connection with other fish. If we could find the answer, we might be able to effect increases in fish production in the Mediterranean."

Asked what the General Fisheries Council for the Mediterranean proposed to do to try to solve the riddles of the disappearing fish, the Secretary explained that the Council, as a body, did not undertake investigations or research work. Its function was to promote cooperation in fisheries work between Mediterranean countries. There were a great number of problems of common interest which could be better tackled jointly by the nations concerned. The investigation of tuna, sardines, and other commercial fish, for example, could be better done if the nations agreed on a coordinated investigation program. In some cases even a cooperative program might be considered in which each nation could make a contribution.

"Although the Mediterranean has been fished since man first appeared in this part of the world," said the Secretary, "its fish stocks have always been relatively poor because food for fish is relatively scarce in the Mediterranean. But fish is an important part of the diet of a great number of the nations whose coasts border the Mediterranean, especially those with deserts and limited areas of arable land. These reasons make it all the more imperative that we should have the knowledge necessary to develop the fisheries and, in particular, the available fish resources.

"An interesting example of how a resource can exist undetected for thousands of years is to be found in the recent development of the Mediterranean shrimp fishery," stated the Secretary. "Shrimp fishing, up to recent years, was of little importance in the Mediterranean. Indeed, some people even believed that there were no worthwhile shrimp stocks. But now trawlers working from Algeria, Egypt, Italy, and Turkey are exploiting substantial stocks of large shrimp. The result has been the rapid development of a shrimp fishery, and a very profitable trade has been established in exports of shrimp to many European countries and the United States."

The General Fisheries Council for the Mediterranean was organized in 1950 under the auspices of the Food and Agriculture Organization of the United Nations and now has 11 members--Egypt, France, Greece, Israel, Italy, Monaco, Spain, Tunisia, Turkey, United Kingdom, and Yugoslavia. The activities of the Council are carried out through committees for exploration, production, utilization, inland waters, and statistics. The investigation of fishery stocks in the Mediterranean is only one item of the Council's program of work, and there are so many problems which urgently need attention that the Council has drawn up a priority list.

The current program includes mapping the quantitative distribution of fish eggs; determination of age and growth of fish; improvement of fishery statistics in Mediterranean countries; the bathymetric and geographic distribution of various species; the distribution, etc., of crustaceans; a study of Mediterranean trawling grounds; and a study of fishing methods and gear, which includes a classification of fishing boat gear and methods. There is also a whole range of work being planned under

the heading of utilization, including transport and refrigeration of fish, fish meal, oil, byproducts, and canning, and so on. Another big field of work is concerned with inland-waters fisheries, the culture of fish in ponds, and the stocking and exploitation of barrage lakes and so on.

"The Council hopes shortly the Governments of concerned will soon make a start on the study of trawling grounds," explained the Secretary. "This work will, of course, take years to complete. One aim is to make maps of all the fishing grounds being exploited and of those which can be fished by trawlers. It would be an advantage if such maps could give local names of the grounds, their size and the nature of the bottom and the characteristics of the animals living there, as well as the main species of fish and edible crustaceans caught in the locality. The maps could also give such information as the most favorable season for trawl fishing and the estimated average return of a boat of acertain type."

The size and scope of the work of the Council is indicated by the fact that at its third meeting, held at Monte Carlo, 54 technical papers were submitted by fishery experts. These have been published in a volume of "Proceedings and Technical Papers."

The next meeting of the Council was scheduled to be held at Istanbul, Turkey, September 17-22, 1956. "We have already an impressive list of technical papers to be presented at the meeting to which representatives of 18 countries and six international organizations have been invited, all of them particularly interested in the work being done to develop and improve fisheries in the Mediterranean," said the Council Secretary.

"Of course, much has been done by nations and organizations, especially under the aegis of the International Commission for the Scientific Exploration of the Mediterranean Sea, but even with that and future plans it will be many years before the full benefit of this new cooperative effort in fisheries will be felt in the Mediterranean. But we hope that the knowledge and understanding we gradually acquire should enable us one day to conserve and develop stocks so that the Mediterranean will yield more fish per year than it has done during any of the past two thousand or more years in which it has been fished."

WHALING

INTERNATIONAL WHALING COMMISSION EIGHTH ANNUAL MEETING: The International Whaling Commission began its Eighth Annual Meeting in London on July 16, and completed its deliberations on July 20, 1956.

All 17 Contracting Governments were represented at the meeting with the exception of Brazil. They comprised Australia, Japan, Denmark, France, Iceland, Canada, Mexico, The Netherlands, New Zealand, Norway, Panama, South Africa, Sweden, the U.S.S.R., the United Kingdom, and the United States, Italy and Portugal were represented by observers as were also F.A.O., the International Council for the Exploration of the Sea, and the International Association of Whaling Companies.

The Commission received from the Bureau of International Whaling Statistics at Sandefjord the catch figures for the past season. Nineteen factory ships with 257

catchers were engaged in the 1955/56 Antarctic season and the total catch by floating factories in the Antarctic increased from 2,061,789 barrels in 1954/55 to 2,134,012 barrels inclusive of sperm oil in 1955/56.

The chief object of the Commission is to arrange a balance between killing and replacement rates of the whale populations. To achieve this it sets limits upon the total catch. This limit takes into consideration the views of scientists upon the size of the stocks of whales and of the whalers on the economics of the industry. Scientific opinion in the Commission was almost unanimously in favor of a substantial reduction in the catch on account of evidence that the stock is declining. The existing catch limit is 15,000 blue-whale units. The Commission recommended that the catch for future seasons should not exceed 15,000 blue-whale units, and they recommended (but with one dissention--The Netherlands) that the limit should be reduced in the coming season (1956/57), to 14,500 blue-whale units.

It is not yet certain that next season's whale catch quota in the Antarctic will be reduced. If Netherland's opposition is followed by an official protest to the Commission within 90 days, the catch quota will have to remain at 15,000 units, in spite of scientists' warnings that whale stocks are being too heavily hunted.

The Commission was glad to note that in general there was a decrease in infractions over the previous year. They also received further confirmation from the Commissioner of the U.S.S.R. about the use of fenders of porous rubber which could replace the present use of whale carcasses for this purpose. The U.S.S.R. agreed to place at the disposal of the Commission full details of these fenders.

At present every factoryship is required to have on board two inspectors who are generally of the same nationality as the flag of the ship. The Commission, however, following the Seventh Meeting at Moscow in 1955, askedthe United States to prepare a Protocol for the amendment of the Convention so as to permit consideration of a scheme to appoint independent observers in addition to the national inspectors. They have agreed to ask the Depository Government to take all possible steps to insure that the Protocol could be brought into force in time for the Commission to take action under its provisions at their Ninth Meeting. It is hoped that this Protocol may very soon be signed.

The Commission heard statements from the Commissioners for Norway and Panama about correspondence which has passed between their Governments on alleged infractions of the provisions of the Convention by a whale factoryship registered with the Panamanian Flag. This matter is still under discussion between the two Governments engaged in whaling.

The Commission decided that a Scientific Sub-Committee should again if necessary meet to consider certain scientific problems in anticipation of the 1957 Annual Meeting.

The 1957 Annual Meeting begins on June 24, 1957, in London, points out the August 3 issue of The Fishing News.



Algeria

<u>CANNED SARDINE MARKET</u>: The sardine industry in Algeria is not at present of any great significance in the economy of the country, states a July 3 dispatch from the United States Consulate at Algiers.

Production of canned sardines is declining, and the industry is in a state of crisis. A brief review of the canning industry's present position reveals the predominant influence of uneconomic practices by fishermen as well as the added difficulties imposed by the revolution.

Sardine production in Algeria amounted to 202, 815 cases in 1955 (valued at about US\$2.6 million) as compared with 428, 800 cases in 1951 (valued at about

US\$5.5 million). The principal cause for the decline in production is the decrease in the amount and value of fish caught by Algerian fishermen who are prohibited by law from using large ring nets.

Table 1 - Algeria's Canned Sardine Pack, 1951-55								
Year	Quantity	Value to the Canners (Not Including Taxes)						
1/	1,000 Cases		Million Francs					
$1955\frac{1}{1}$	203	2.6	912.7					
1954+	245	3.1	1,101.1					
1953-1	299	3.9	1,354.3					
1952	400	5.1	1,800.6					
1951	429	5.5	1,929.6					
1/ Includes	1/ Includes the pack from imported frozen sardines.							

Another reasonfor small catches over recent months has been the imposition of a

curfew which prevents the fishermen from fishing all night. Due to the limitation on the use of nets, most fishermen have not invested in any large craft which would increase their range. The curfew has thus practically confined them to early evening fishing. In most of the fishing villages the curfew is 9 p.m.

Proposals originating primarily from the canning industry are now being put forward in the hope of encouraging an increase in the size of the sardine catch. Fishermen's organizations want to carry out an experiment during which they would be permitted to use ring nets; the catch would be sold to the factories for a guaranteed price; the factories would obligate themselves on the day preceding the catch to take a minimum amount of fish and the fishermen using the ring nets would withhold their catch from the fresh fish market. Economic circles express concern over the harm which would be done to fishermen if the present system were changed, although it is difficult to imagine how their situation could become more precarious. Le Messager, a commercial newspaper in Algiers, has actually proposed the institution of a special tax on sardines caught with ring nets to provide a fund for the rehabilitation of fishermen driven out of the business.

There were 53 factories canning sardines in Algeria in 1951. This number has been reduced to 40, and several factories are preparing to close in 1956. Some of the factories have maintained production by importing frozen sardines from French Morocco where there are no limitations on the use of nets. Despite these

	Table 2 - Algeria's Imports and Exports of Canned Sardines, 1951-55									
Year		IMPORT	S	EXPORTS						
rear	Quantity	Va	alue	Quantity	Value					
	1,000 Lbs.	US\$1,000	Million Francs	1,000 Lbs.	US\$1,000	Million Francs				
1955	921	312	109.1	7,376	2,311	808.9				
1954	350	125	43.8	10,180	2,757	964.9				
1953	363	133	46.6	11,318	2,983	1,043.9				
1952	296	102	35.7	16,566	4,225	1,479.0				
1951	161	65	22.6	16,424	4,290	1,501.6				

imports of frozen fish, Algeria's net exports of canned sardines have been declining at a rapid rate. The net export value amounted to US\$2.0 million in 1955 as compared with US\$4.2 million in 1951. The increase in imported sardines has been principally from French Morocco with France a close second. Most foreign brands of sardines sold in Algeria are actually imported from French distributors by Algerian merchants.

Domestic consumption estimated at an annual average of 30,000-40,000 cases, has remained relatively unchanged over the past five years. The native population provides the principal market for canned sardines. Although consumption by income group is not known, it is believed that the low-income native population consumes about 80 percent of the total.

The most popular size can is a flat can of $3\frac{1}{2}$ to 5 ounces. Another popular can is the $13\frac{1}{2}$ -ounce oval can of pilchards which retails for about 29 U.S. cents. The most popular packing medium is a mixture of olive and peanut oils. Sardines packed in this medium are labeled, "Sardines a 1' huile." Sardines packed in pure olive oil are so labeled and are sold at a ślightly higher price. Tomato sauce is an unpopular medium for packing sardines.

The retail price of the $3\frac{1}{2}$ -to5-ounce flat cans varies from about 17-27 U.S. cents a can if the medium is olive oil and from 16-26 cents a can if the medium is a mixture of olive and peanut oils. The $13\frac{1}{2}$ -ounce oval cans of pilchards retail at prices varying from 19-36 cents a can.

The opportunity for imports of canned sardines from the United States is extremely limited because local production meets consumption needs at the present level of prices. Third countries maintain exports of canned sardines to Algeria primarily by means of trade agreements with France. French bilateral trade agreements apply automatically to Algeria. The tariff on imported sardines is 95 percent ad valorem.

Imported sardines are normally distributed by importers direct to retailers or wholesalers. Domestic production is distributed by wholesale houses, although several factories carry out distribution direct to large retailers.

Note: Values converted at the rate of 1 franc equals US\$0,00857.



ACT SETTING UP FUND TO DEVELOP FISHERIES PASSED: The Whaling Industry Act Repeal Act 1956, providing for the sale of the Government-owned Australian Whaling Commission's station at Carnarvon, Western Australia, to private operators, and the Fish Industry Act 1956, providing for a Fisheries Development Trust Account, were passed by the Commonwealth Parliament in May 1956. The Fish Industry Act 1956 which will be financed by the surplus which will arise from the sale of the Whaling Commission's business, will make possible the biggest move in Australia's history for the development of the nation's fishery resources, points out the (Australian) Fisheries Newsletter of June 1956.

Note: See Commercial Fisheries Review, August 1956, p. 63.

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CANNED SARDINE MARKET: One small firm in Albany, Western Australia, has on several occasions canned small amounts of pilchards. However, this firm has always used a tall round can for which there is practically no market. This firm canned 70 tons one season, but there has been no production the last two seasons. That is the extent of canning of sardine and sardinelike fish in Australia, states a July 16 dispatch from the United States Embassy at Canberra.

The Commonwealth Bureau of Fisheries reports that preliminary surveys indicate commercial quantities of pilchards are available on the coast of Northern New South Wales, Queensland, and parts of Western Australia. They plan to con-

duct a more detailed commercial survey this coming season. They believe that pilchards will develop into a commercial enterprise, but that the catch will be utilized for oil and meal rather than for canning purposes. There is a ready and quick market for meal and oil with a minimum of capital expenditure, whereas the cost of equipment and facilities for canning is prohibitive for the current market.

Table 1 - Representative Retail Prices of Canned Sardines in Canberra, Australia, July 11, 1956								
Product Packing Medium Can Size Price Per Can								
Norwegian sills		$3\frac{3}{4}$ oz. flat $\frac{1}{2}$ size flat $4\frac{1}{2}$ oz. flat $4\frac{1}{2}$ oz. flat 7 oz. flat	1s. 10d. 1s. 3d. 3s. 6d. 3s.	14 39 34				

The domestic consumption of sardines is almost entirely from imports. The past two years consumption has been about 5 million pounds annually; however, import restrictions have limited quantities entering Australia.

Per-capita consumption of canned fish varies annually depending on the quotas granted importers. Fish is not a staple item in the diet of Australians. Prior to the immigration program of Europeans, sardines were consumed in fairly limited amounts in Australia. The increase in demand for sardines is a direct result of the tastes of the "New Australians." The trend is for an increase in the demand for sardines; however, the amounts authorized to be imported depend on the balance-of-payments position of Australia.

Table 2 - Average Retail Prices of Imported Canned Sardines (Double Layer, 3 ³ / ₄ oz., Olive Oil) in Sydney, 1951-55									
Currency Unit	1955	1954	1953	1952	1951				
	(Per Can)								
In pence (d.)	21.31			21.48					
In U. S. cents									

The popular sizes of canned sardines are almost exclusively the small $3\frac{1}{4}$ -5 oz. flats. A limited amount of other sizes has been offered for sale, but they sell only when the preferred flats are not available.

The most popular packing medium is olive oil; other mediums, mostly vegetable oils, are offered to the consumers but are not as readily acceptable.

Sardine consumption is the greatest among the "New Australians." The majority of these people coming from Continental Europe would be classed in the low-income group because of their unskilled work. Actually, this may not be a correct classification because these people are industrious and by working overtime and by multiple employment their income by Australian standards would place them in the middle-income group. Sardine consumption other than by the "New Australians" would be by all income groups and influenced by religious beliefs.

Table 3 - Averag					nes		
(Double Layer, $3\frac{3}{4}$ oz., Olive Oil) in Melbourne, 1953-56							
Currency Unit	April-June 1956	1956	1955	1954	1953		
		(Per	Dozen Car	ns)			
In shillings (s.) and pence (d.) In US\$	16s, $8\frac{1}{2}$ d.	$15s.8\frac{1}{2}d.$ 1.76		$14s.7\frac{3}{4}d.$ 1.64			

Australia's canned sardine imports have climbed steadily from 420,000 pounds (valued at AL83,000 or US\$197,000) in 1952/53 to 4.7 million pounds (valued at AL835,000 or US\$1,870,000) in 1953/54, and to a record high of 5.7 million pounds (valued at AL1,062,000 or US\$2,378,000) in 1954/55 (table 4). The majority of sardine imports are from Norway--84 percent in 1953/54 and 71 percent in 1954/55. It is estimated that imports for 1955/56 were at a slightly reduced level because of import restrictions. The import level for 1956/57 has been reduced a further 25 percent by import restrictions, effective July 1, 1956. Effective July 1, 1956, the import quota is 75 percent of 1954/55 imports and the budget is entirely for the non-dollar areas. Canned sardine imports fall into Category A for import license purposes.

Table 4 - A	Table 4 - Australia's Canned Sardine Imports 1953/54-1954/55									
Country of Onigin	Quar	ntity	Value							
Country of Origin	1954/55	1953/54	1954/55		195	3/54				
	1,000 Lbs.	1,000 Lbs.	AL1,000	US\$1,000	AL1,000	US\$1,000				
United Kingdom	359	357	81	181	67	150				
Other British										
Countries	99	-	13	29	-	-				
New Zealand	-	14	-	-	6	14				
Morocco	97	32	15	33	6	13				
Denmark	236	-	31	70	-	-				
Norway	4,084	3,927	795	1,780	713	1,598				
Sweden	37	-	6	15	-	-				
Germany	274	-	38	84	-	-				
Portugal	471	161	74	166	23	51				
South Africa	-	90	-	-	6	13				
Other	60	89	9	20	14	31				
Total	5,717	4,670	1,062	2,378	835	1,870				

The import duty on canned sardines is 1d.(0.933 U.S. cents) a pound for British preference countries, 2d.(1.87 U.S. cents) a pound for most-favored countries, and 3d.(2.8 U.S. cents) a pound for other countries, principally Japan.

Because of Australia's present balance of payments difficulties and limited dollar earnings, it is extremely doubtful if they would favor or permit sardine imports from the dollar area. Australia prefers to utilize dollars for the purchase of raw materials, plant, and machine goods from the dollar countries.

The Australian Government is not involved in the purchase of sardines, but it does control imports by a quota and import license system.

The importer who obtains a license imports the sardines. The importer sells to a wholesaler, who, in turn, sells to the retail trade. In some cases the importer would also be the wholesaler.

Note: Values converted at the rate of AL1 equals US\$2,24.

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<u>CULTURED PEARL FARM</u>: The first step toward the establishment of a joint Japanese, Australian, and United States cultured pearl farm occurred on June 20 when a Japanese pearling lugger arrived at Broome, Western Australia. The lugger carried 15 Japanese specialists who are to begin the culture of pearls in a four-square-mile area in Brecknock Harbor, between Augustus Island and the mainland some 200 miles north of Broome.

The Nippon Pearl Company of Tokyo made an agreement with an Australian company, Pearls, Pty. Ltd., whereby the former is to supply specialists and about half the funds required and the latter is to be responsible for all arrangements in Australia.

The arrangements were approved by the Commonwealth and the State Governments, and the Australian company (in which Male and Co., Broome pearlers, Brown and Dureau Ltd., Melbourne importers and exporters, and the Otto Gerdau Co., New York, are participants) received a three-year license for the pearl farm area. It was reported that some 35,000 immature oysters would be planted in the first year and that the bulk of the artificial pearls produced would be marketed in the United States, a July 27 dispatch from the United States Consulate at Perth announces.

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NEW DEPARTMENT OF AGRICULTURE, FISHERIES, AND WHALING ESTABLISHED: In the reorganization of Australia's Federal Ministry in January 1956, the Department of Commerce and Agriculture was abolished and its commerce functions became the responsibility of a new Department of Trade; and agriculture, fisheries, and whaling were given the full-time attention of a new Department of Primary Industry.

Some of the views on fisheries of the new Minister of Primary Industry as published in the (Australian) $\underline{\text{Fisheries}}$ $\underline{\text{Newsletter}}$ of March 1956 follow:

". . . Our agricultural and pastoral production are much greater in volume and value than our fishery production. This does not mean that fisheries, the second branch of food production, are to be regarded as of little importance.

"In fact, fishing is already an important industry, with production of about 57, 000 tons and earning over five million dollars a year for Australia, plus 22, 350 tons of whale products with an export value of about £1.6 millions.

"Other factors must also be taken into consideration.

"Even in a meat eating country like Australia, fish is needed for variety and for its special mutritional values, particularly in institutional and invalid diets. And of course there is the national need to increase exports to which our fisheries resources, if properly developed, could make an even greater contribution; for example, prawns, which I will be mentioning again.

"In face of this double need for increased fish production, the catch is unfortunately not keeping pace with our rapidly growing population. Normally, imports provide about half the supply of fish available for consumption in Australia. The last few years should have taught us how unwise it is to rely on imports for essential needs. The recent restriction of imports of course includes fish.

"Moreover, if we can produce more fish and thereby import less, or at least not an increasing quantity to meet the growing shortage, we shall correspondingly improve Australia's trade position.

"There is, therefore, urgent need to explore our latent fishery resources and to begin, as soon as possible, to develop them.

"I know, for example, there are trawling grounds in the Great Australian Bight which are not being worked but which could produce a big catch of fish suitable for consuming in fresh form,

"I think further work may be needed on tuna, for the slow development of this promising young fishery is not wholly due to competition in overseas markets.

"There is also work to be done for the prawn fishery, which one experienced American fishing executive thinks may become even a bigger dollar earner than crayfish.

"I have read with interest part of the discussion which proceeded in the <u>Newsletter</u> through most of last year on developmental problems and how they might be solved. It seems clear that some lead is required to awaken a new spirit of enterprise and enthusiasm in the fishing industry, and to make a start with the harvesting of our latent sea food resources. South Africa in its Fisheries Development Corporation found one way of doing this.

"Nobody of course would expect me already to have to come to any conclusion as to what might be the best way of going about fishery development in Australia. But I am glad to take this early opportunity of telling professional fishermen and the other sections of the fishing industry in Australia (for in any developmental plans fishermen, processors and distributors will all have to pull together) that it is my desire as Minister for Primary Industry to see fish production greatly increase, both for domestic consumption and also to provide exports to help pay for the imports which Australia must obtain for its national development..."

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SHRIMP EXPORTS TO UNITED STATES: Arrangements have been completed to export the bulk of raw headless shrimp produced by the Queensland Professional Fishermen's League to the United States. It is hoped that this may be the beginning of a substantial dollar export trade in shrimp to the United States, reports the

State Secretary of the League. The frozen shrimp (Banana prawn, Penaeus merguiensis) will be exported by the Fish Board, states the Australian Fisheries Newsletter of June 1956.

The price offered by the Board has been accepted by the members of the League and the Board is extending facilities to the fullest to complete shipments to the United States and "I have every reason to believe it could become a million dollar industry," says the State Secretary.

The shrimp will be exported raw headless in four grades, ranging from 15-25 count for the largest to 40 for the smallest. Fishermen will receive 1s.9d. (19.5 U.S. cents) a pound heads on, or 2s. 9d. (30.7 U.S. cents) heads off, net at place of production. Loss of weight in heading is about 22 percent.

United States importers have indicated they will take a very large quantity if shipments are satisfactory.

Note: Values converted on basis of ALL = US\$2,232.

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WESTERN AUSTRALIA SHRIMP SURVEY: In 1952 the Western Australian State Government Fisheries Department made a vessel, the P. V. Lancelin, available for a shrimp or prawn survey from Fremantle to Broome. The survey was made during winter, the least favorable part of the year for such an investigation. Nevertheless, results were promising, the June 1956 (Australian) Fisheries Newsletter states.

The following winter (1953), the Exmouth Gulf area was investigated. This region provided a certain amount of shelter, plus suitable trawling grounds necessary for the development and testing of fishing gear. This work was resumed and extended during the winter of 1954.

Quantities of the following commercial species were obtained during the 1952 survey: tiger prawn (<u>Penaeus esculentus</u>), banana prawn (<u>P. merguiensis</u>), Western Australian king prawn (<u>P. latisulcatus</u>), greentail prawn (<u>Metapenaeus mastersii</u>). Other species were caught but none are at present of commercial importance.

For completeness a summer survey was essential and the \underline{P} , \underline{V} , $\underline{Lancelin}$ was made available for September to May, 1955/56. A refrigerated fishing vessel, the $\underline{Jon\ Jim}$, accompanied the \underline{P} , \underline{V} , $\underline{Lancelin}$ for the first few weeks of the cruise, to examine the possibilities of catching and freezing shrimp commercially. Results during the early part of the cruise were encouraging. In winter the tiger prawn had predominated, but now large quantities of the banana prawn were caught, the best single catch from one hour's trawl being 400 pounds.

<u>Peel Inlet</u>: This estuarine system resembles mmy on the east coast of Australia. The high salinity of Peel Inlet in late summer may be responsible for the paucity of prawns there, and may confine them to the Murray River where most are caught at this time of the year.

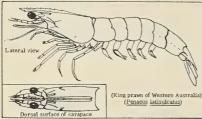
The principal species caught is <u>Metapenaeus mastersii</u> (Haswell), knownin eastern Australia as the greentail or greasyback, but referred to as the school prawn in Western Australia. The school prawn of eastern Australia is <u>Metapenaeus macleavi</u> (Haswell), and it would be better if the common names were uniform, provided school prawn is not too firmly established locally. The Peel Intels shrimp do not have such a distinctive green tail as those from eastern Australia, but have nevertheless, a distinctly greenish tinge. (Species

from Exmouth Gulf have a reddish tail, but this is a peculiarity of specimens from this region.)

There is some evidence that the western and eastern Australian M. mastersii are distinct subspecies. There are several constant anatomical differences and in addition they reach sexual maturity at different average sizes.

All the shrimp were caught in shallow water at night during January and early February and were sexually mature, and a large proportion of the females were ripe and impregnated. This indicated that spawning occurred at this region of the Murray River. The spawning of this prawn so far up an estuarine system is most unusual, especially in a region with a low salinity surface layer, into which shrimp move at night. The lower layers of

higher salinity would provide an environment more usual for spawning shrimp of this species. At Pinjarra there was a shallow sill with very low salinity water above it, and this may provide affective barrier to the larger shrimp. However, postlarval shrimp about half an inch long have been known to penetrate up a river into nearly fresh water, and it is quite likely that the upper regions of the Murray River have a large juvenile population. Suitable equipment for collecting these small shrimp, and also for trawling the bottom of the river, was not available at the time, and further information as to the population distribution could not be obtained.



It is of interest that the fishery is confined to the hours of darkness. In the Brisbane River, Queensland, this species is most often caught with small trawls during daylight. Some trawling at dusk and night is also done, usually in the upper reaches of the river. It would be of interest to use a beam trawl (no more than eight feet across) in the Murray River during daylight.

It is thought most unlikely that the present methods of fishing could appreciably deplete the shrimp population of the Murray River. Trawling by several dozen small craft has been carried out in the Brisbane River, Queensland, for years without any reduction of abundance. As the shrimp are sexually mature at capture, and as it is presumed they do not survive a season's spawning, it is obvious there has been no reduction in average size due to overfishing.

Large annual fluctuations are common in most shrimp fisheries. The peculiar hydrographical nature of Peel Inlet and its rivers is likely to cause even greater population fluctuations here than elsewhere. The larger shrimp have moved far up the system by the time winter flooding occurs and are likely to be subject to a greater mortality. During winter in these latitudes growth and activity are almost suspended. In the Brisbane River a large number of near-mature shrimp survive winter, as well as small juveniles, so that there is a spring spawning which provides a late summer abundance. The smaller sizes reach maturity during summer and a constant population of large shrimp is maintained. At Peel Inlet, however, it is alleged that full-size shrimp are not obtained until well into summer. If this is correct, it is likely that a population of only small juvenile shrimp survives winter and provides the late summer catches. A prolonged winter with flooding could have a marked effect on such a population.

Exmouth Gulf: The species caught here are the tiger prawn, Penaeus esculentus (Haswell), the

banana prawn, P. merguiensis (de Man), and to a much lesser extent the king prawn, P. latisulcatus (Kishinouye) and the brown or endeavour prawn, Metapenaeus endeavouri (Schmitt). A few speciments of M. mastersii also appear sporadically. Two Trachypenaeus species and a Metapenaeopsis species are also common at night, but are too small to be of commercial interest. The tiger and banana prawns are sexually mature and hence, for the reason stated above, it is pointless to search for larger size shrimp. Male tiger prawn are sexually mature at an average length of 145 mm. (5.7 inches, and females at an average of 155 mm. (6.1 inches). Banana prawn are sexually mature at a slightly larger size than the tiger prawn (about in. longer for both sexes).

Numerous trawls with the small frame trawl were made in shallow water and in Beadon Creek, Onslow, and Wapet Creek, Exmouth Gulf. Salinity of water samples from these regions was very high, and probably explains the paucity of postlarval stages, as the marine fauna was a restricted one. While it is possible that the juvenile stages are to be found uniformly scattered over the large areas of shallow water found in the Gulf, previous experience suggests that this is unlikely. The younger stages seem generally to prefer sheltered water with plenty of algal cover. As the salinity of all the numerous inlets of the Gulf is likely to be high, it is quite probable that the bulk of the juvenile stages may be found outside. In eastern Australia several of the commercial species seem to work down a salinity gradient as growth proceeds.

The Ashburton River, whose mouth is adjacent to Exmouth Gulf, is reputed to have an unusually large stream discharge compared with other northwestern rivers. It is common local knowledge that small and medium size shrimp can be caught in this river fairly readily. Unfortunately it was not possible to examine this river and adjacent waters, but it is possible that a large population of juvenile shrimp is present in this river. As these approach sexual maturity, they would make their way down into the Gulf where spawning occurs. The high salinities would effectively bar the succeeding postlarval stages from moving to the southern part of the Gulf, and they would eventually move up the salinity gradient into the Ashburton River.

Unlike Peel Inlet, Exmouth Gulf should provide an extremely stable fishery. The average annual rainfall of the region is between 10 and 15 inches, and prolonged flooding of any of the "murserygrounds" is most unlikely. However, as it is a spawning or prespawning population that would be fished, sudden short-term fluctuations are to be expected. These fluctuations seem a characteristic of shrimp fisheries, e.g. shrimp which have been abundant in an area for a few weeks suddenly disappear and are found in another nearby loc ality differing slightly from the previous one, and so on. These difficulties can be resolved only by local knowledge which must be found empirically. This would best be achieved by fishing vessels (preferably three or more) attempting to fish the area.

Present indications are that the tiger prawn will be the most regularly caught species, with the banana prawn comprising larger actual catches but extending over a shorter season. Both these shrimp, especially the latter, are excellent commercial species from all viewpoints. "WHITE" SPINY LOBSTER SEEN AS MOULTED ADOLESCENT: During the late spring, for approximately three weeks, there exists on the Western Australian coast an intensive fishery for a particular type of spiny lobster or crayfish, commonly called "white" crayfish. These are pale in color, readily distinguished in color only at the beginning of the "run" from the red spiny lobster (Panulirus longipes) caught in the deeper waters later in the season.

The "whites" are usually caught on a sand bottom and a pot set accidentally on reef bottom yields only red spiny lobster.

During the period in which "white" spiny lobsters are caught, the red spiny lobsters are in berry, i.e., they have spawned and have the bright orange eggs adhering to the pleopods of the abdomen. From visual observation, the ovaries of "whites" are not mature and mating has not taken place, i.e., the females have not acquired sperm packets.

During the "white" spiny lobster season (approximately November 20 to the end of December), the catch of "whites" along the coast is of the order of 2,000,000 pounds live weight. This quantity represents approximately one-fifth of the total production of all spiny lobster throughout the nine months' open season in Western Australia. The catch of "whites," therefore, in the eyes of the fishermen, is most important from the financial aspect.

From data collected over a period of years, white spiny lobsters can be said to be newly moulted animals, lacking the red pigment found in all size groups of the "red" spiny lobster.

The absence of small "whites" below $2\frac{1}{2}$ inches and above $3\frac{1}{2}$ inches suggests that the "whites" are a phase in the "red" cycle, and first occur when the spiny lobsters are approaching maturity. This could therefore be termed an adolescent phase. From tagging returns, the "whites" move offshore at a fairly steady rate after the commencement of the "run." The "run" of "whites" commences when the "whites" crawl into the pots. This does not necessarily indicate their immediate "arrival" from another area. They possibly migrate onshore sometime before they are caught. In any case they do not feed, since baited pots set before the "run" of "whites" yield nothing.

The non-attractiveness of the bait at this time can be explained by the fact that just prior to, and for approximately ten days after, moulting, food is not sought. When the "whites" do "run," however, they are caught in large numbers, the catches per pot increasing from a mere 1 or 2 to 30 or 40 overnight. The actual date of the commencement of the catch of "whites" varies from area to area and from year to year. There is nevertheless only about a fortnight's variation in its onset each year.

A possible picture of events could include the migration of adolescent pale-colored spiny lobsters to relatively shallow sandy areas where moulting takes place. This is followed by heightened feeding activity and a movement offshore with a possible tendency for the spiny lobsters to deepen in color. The numbers of the "whites" caught decrease until, in the words of the fishermen, "they disappear and the 'white' season has ended."

The fact that individual "whites" can be caught again the following "white" season suggests that this "white" phase is not restricted to only one period in the life of a spiny lobster, but that two "white" phases can occur at approximately the same time of the year in at least two successive years.

It has also been shown that an undersize "white" crayfish can grow to 3.0 inches in carapace length and take on the red coloration normally found in spiny lobsters at other times of the year, points out the (Australian) <u>Fisheries Newsletter</u> of June 1956.



Austria

<u>CANNED SARDINE MARKET</u>: Austria has no domestic production of sardines and sardinelike fish, such as true sardines, small herring, pilchards, and sprats (brisling), points out a June 29 dispatch from the United States Embassy at Vienna.

Of the canned sardines imported in Austria, the true sardines packed in olive oil are most popular among consumers. While smaller quantities of sprats (brisling) were imported in the past, particularly from Belgium, none are being imported now since they are not popular with Austrian consumers. Best estimate on Austria's consumption of canned sardines in 1955 was approximately 3, 400 metric tons.

Sardines are quite popular with Austrian consumers, although meat is preferred to fish in general. For some years the trade has been trying to educate the general public to the excellence and good food value of fish in general, but no visible progress has been made. Sardines are not used for main courses as in some countries, but principally for snacks and sandwiches. Hors d'oeuvres served in restaurants, which also include sardines, command relatively high prices.

About 90 percent of the consumers prefer the $3\frac{1}{4}$ -5 oz. flat cans. A few 1-lb and 1-kilogram (2.2 lbs.) cans are purchased by restaurants, snack bars, and delicatessen stores. About 50 percent of the sardines consumed are packed in olive oil, and the others are packed in vegetable oil (20 percent), fish oil (15 percent) and tomato sauce (15 percent). The percentage of sardines consumed by the high, middle, and low income groups is estimated at 10, 40, and 50 percent, respectively. Retail market prices for the $3\frac{1}{4}$ -5 oz. cans: olive oil pack from 17-20 U. S. cents a can, vegetable oil pack 11.5-19 cents, tomato sauce pack 12 cents, and fish oil pack 16 cents; 1-lb. rectangular olive oil pack 58 cents; 2-oz. olive oil pack 13 cents.

Obstacles to the import of canned sardines and sardinelike fish from the United States, according to trade sources, are:

- 1. Portuguese sardines, packed in olive oil, are most popular with Austrian consumers. As far as other packing mediums, such as vegetable oils and tomato sauce, are concerned, European flavors are preferred.
- 2. Prices of American canned sardines and sardinelike fish are comparatively high.
- 3. While sea freight charges on imports from the United States raise prices considerably, European continental exporters have relatively lower freight charges on exports to Austria.
- 4. Since sardines are rather expensive and not used for main courses, Austrian consumers prefer small cans.

Although imports from the dollar area of canned fish are liberalized, imports are handicapped by the reasons given above.

It is noteworthy that Portugal, although not a member of GATT, has a special agreement with Austria where Portuguese canned sardines are subject to an Austrian 15-percent ad valorem duty. This preferential rate does not apply, however, to other fish products imported from Portugal, such as anchovies, tuna, and mackerel.

Canned sardines are imported by commercial agents or importers. They in turn distribute the commodity to wholesalers, retail chains and retailers. The Austrian Government does not purchase sardines.

Austrian foreign trade statistics do not show canned sardines and sardinelike fish separately; they are included under canned fish and canned crustaceans.

In 1955 Austria imported a total of 5,499 metric tons of canned fish and canned crustaceans, valued at US\$2,597,000. According to the best trade estimates about 60 percent of this amount was sardines and sardinelike fish, about 5 to 10 percent crustaceans, and the balance other canned fish (table 1).

Table 1 - Austria's Imports of Canned Fish and Crustaceans, 1955									
Country of Origin	Quantity	Val		Estimated Percentage Composition of Imports					
	Metric Tons	Million (S)	US\$1,000	%					
West Germany	2,160	22.9	879	40% small herring; bal- ance other fish products (mainly herring fillets).					
Yugoslav	822	11.8	453	50% true sardines; bal- ance tuna and anchovies.					
Denmark	598	6.7	258	80% small herring; bal- ance mackerel, cod liv- ers, and crustaceans.					
Portugal	1,650	22.1	851	95% true sardines; bal- ance tuna and mackerel.					
French Morocco .	98	1.3	51	100% true sardines.					
Other Countries1/	171	2.7	105	-					
Total	5,499	67.5	2,597	-					
1/ Small quantities of canned	d sardines and sardinelik	e fish are also bei	ng imported fro	m France, Norway, and Sweden.					

Portugal furnishes Austrian importers with cans of the so-called "Club $\frac{1}{4}$ " format, which are 25 and 30 millimeters high. One seldom sees in Austria the type can which Portugal ships to the United States, e.g. "usual $\frac{1}{4}$ " cans, 22 millimeters high.

Trade sources attribute the low level of Moroccan sardine imports to political conditions in that area but expect that imports from that country will gradually increase. Sardines from French Morocco are good quality and cheaper than Portuguese brands, although the latter are better in quality.

Sardines imported from Portugal, French Morocco, and Yugoslavia are packed either in clive oil, vegetable oil (peanut oil), or other substances. Canned sardines and sardinelike fish imported from Denmark and Germany are principally packed in tomato sauce and soy bean oil.

Trade sources are of the opinion that fish packed in cottonseed oil would not find a market in this country as the taste of this oil would not appeal to Austrian consumers.

Note: Values converted to US\$ equivalent at the rate of 1 schilling equals US\$0.03846.



Belgian Congo

CANNED SARDINE MARKET: There is no domestic production of canned sardines in the Belgian Congo. Of the 1,862 metric tons (valued at US\$760,675) of canned sardines imported in 1955, 125 tons were imported from the United States. Ninety percent of the consumers, practically all Europeans in the high income group, prefer the $3\frac{1}{4}$ -5 oz. can of sardines packed in olive oil. About 9 percent buy the 8-oz. tall cans, and the balance 8-oz. ovals and 1-lb. ovals. The olive-oil pack is almost universally preferred. The retail market price for the $3\frac{1}{4}$ -5 oz. can of canned sardines in olive oil ranges from 16-21 U.S. cents a can, points out an August 6 dispatch from the United States Embassy at Leopoldville. The 8-oz. tall packed in olive oil retails for 32 cents a can. Canned sardines in tomato sauce retail in 8-oz. ovals at 34 cents a can and in 1-lb. ovals at 39 cents a can.

The Portuguese sardine industry is well established in the Belgian Congo and its products are known and liked by Europeans. The Africans are not sardine consumers, since they are able to obtain local dried fish much more cheaply. Only if United States sardines were much cheaper than the present prices, including cost of transport, would there be an opportunity for exports. Sardines are too expensive for the bulk of the African population and must compete in European tastes with European tuna, as well as the large quantities of fresh and frozen fish brought in from the neighboring colony of Angola.

A large proportion of the food importers are Portuguese, both as retailers and as intermediaries in the native and rural trade, and it is only natural that their business contracts would be with suppliers of Portuguese sardines, although French sardines are seen in the "luxury" food stores.



Burma

<u>CANNED SARDINE MARKET:</u> There is no production of canned sardines in Burma, an August 2 dispatch from the United States Embassy at Rangoon points out.

Of the canned sardines sold in Burma, 55 percent are packed in 1-lb. oval cans, 25 percent in 8-oz. ovals, 10 percent in 8-oz. rectangulars, 5 percent in 8-oz. talls and 5 percent in 1-lb. talls.

About 80 percent of the sardines consumed are packed in tomato sauce, 5 percent in olive oil, 5 percent in vegetable oil, 5 percent in brine, and 5 percent natural.

	Burma's Reta	ail Prices for Car	med Sa	ardines
	Size of Can	Type of Pack	Pri	ce Per Can
			Kyat	
	$3\frac{1}{4}$ to 5 oz.	Tomato sauce	0.90	19
	$3\frac{1}{4}$ to 5 oz.	Brine	1.25	26
	8 oz. tall	Olive oil	2.25	47
	8 oz. tall	Vegetable oil	2.50	53
	8 oz. tall	Brine	1.50	32
ì	8 oz. oval	Tomato sauce	1.50	32
	8 oz. oval	Brine	1.50	32
	8 oz. rectangular	Olive oil	2.25	47
	1-lb. oval	Tomato sauce	1.90	40
	1-lb. oval	Brine	2.25	47
9	1-lb. tall	Brine	2.25	47
	15 oz. (Japanese,			
	price controlled)	Tomato sauce	1.90	40
	$7\frac{1}{2}$ oz. (Japanese,			
	price controlled)	Tomato sauce	1.50	32
	Note: Values converted at the	e rate of one kyat equals 2	1 U. S. ce	nts.

The percentage of sardines consumed by the high, middle, and low income groups is estimated at 10, 70, and 20 percent, respectively.

The retail market price for the 1-lb. oval canned sardine packed in tomato sauce is about 40 cents a can, and the 8-oz. oval 32 cents (see table).

The Burmese Government conserves its United States dollars and other American-account funds by restricting imports to essential commodities not economically obtainable from soft-currency areas. Canned sardines are, therefore, purchased principally from sources in Japan, Portugal, the United Kingdom, and Denmark. The <u>Bulletin of Import Trade</u> lists canned fish importations without specifying types.

Domestic distribution is ordinarily effected through Burmese import firms. Importers then wholesale the imports to retail outlets without promotion by either.

Imports of Japanese origin are purchased by the Civil Supplies Management Board for distribution to registered cooperatives for sale at fixed prices.

In all probability, transportation difficulties (including cost) and less westernized tastes reduce consumption greatly outside the city. In Rangoon, probably only occidentals and westernized orientals eat many sardines, to judge from the class of retail outlets which handle them.

The population of Burma is comprised of many different ethnic and religious groups, almost all of whom satisfy a large portion of their protein requirements with fish, which is an acceptable food. The local fish industry cannot supply enough fresh fish, and there are no processing facilities. Consistently, one of the largest imports from Japan has been fish and fish preparations, and this category forms a respectable proportion of the total imports.



Canada

AUREOMYCIN USE ON FISH ACCEPTED BY AUTHORITIES: The use of aureomycin within specific quantitative limits has been found acceptable by the Canadian Department of National Health and Welfare. The necessary amendments to the regulations to permit this use will be recommended to the Minister by the Food and Drug Directorate, reports the August 10 issue of the Fisheries Council of Canada Bulletin.

Canada is reported to be the first country in the world to approve the use of aureomycin on edible fish.



FRESH SILVER SALMON EX-PORTS PROHIBITED AFTER AU-GUST 31: Exports of fresh silver or coho salmon are prohibited after August 31 each year as a result of changes in British Columbia fishery regulations, reports the July 1956 Trade News of the Canadian Department of Fisheries.

In past years special prohibition orders were issued from year

to year. The regulation is now amended so that the order will have a continuing application.

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PEARL ESSENCE PRODUCED ON WEST COAST: Pearl essence, for many years produced on the North American Atlantic coast, is now being produced on the Pacific from British Columbia herring scales. As fish are pumped from seiner to packing boat, they pass over baffles and screens which remove the scales without damaging the fish, about 100 hundred tons of fish produce one ton of scale, which produces one pound of essence, according to reports from Canada.



Denmark

FISH CONSUMPTION DOWN: Speaking to the annual convention of retail fish dealers, the Danish Minister of Fisheries stated that in the past 5 to 6 years the per capita consumption of fish in Denmark has declined steadily from 35.2 to 24.2 pounds annually. The main reason, he asserted, is the high price of fresh fish and, in this connection, he referred to the steady increase in the number of boats fishing for industrial fish and the resulting decline in the catch of fish for human consumption.

The trend toward more industrial fishing continues and there seems little possibility of formulating a plan to check it. Another factor in the high price of fish is the high cost of distribution, which is also connected with the Danish consumer's preference for buying fish in a live rather than frozen state, points out a United States Embassy dispatch (August 10, 1956) from Copenhagen.

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LIFT-UP WHEELHOUSE FOR SEINERS: A novel feature has been included by a Danish designer (Knud E. Hansen) of two 65-foot-Diesel seiners being built in England. The entire wheelhouse and skipper's cabin will be constructed of aluminium and built to lift off in one piece so that the complete engine installation can be removed. This will save time and expense during repairs and maintenance. All piping and electrical leads have been designed to break on the superstructure.



Ecuador

REGULATIONS AFFECTING FISHERIES: The Ecuadoran Monetary Board was authorized to require fishing companies to convert up to their entire export earnings at the Central Bank's official rate of exchange. The companies up until now have had to convert only \$100 a ton at the official rate. The balance could be kept or converted on the free market. Fishing companies (three of the four now operating are American-owned) are complaining that a drastic change in the present formula would put them out of business.

Another new regulation fishing companies are protesting requires that export taxes be paid in full on fish exports unless they are clearly "industrialized," i.e., canned rather than merely refrigerated or frozen.

A fifth fishing company plans to enter the field soon. It expects to establish a cannery, freezing plant, and cold-storage plant in Guayaquil, points out a United States Embassy dispatch (August 13, 1956) from Quito.



Egypt

<u>CANNED SARDINE MARKET</u>: There is no production of canned sardines in Egypt, states a July 19 dispatch from the United States Embassy at Cairo. Consumption of sardines is comparatively small in relation to the population.

True sardines are imported largely from Portugal and to a lesser extent from Morocco. Small quantities are also imported from France and Yugoslavia. Imports of true sardines during 1955 amounted to 813, 275 pounds (valued at US\$196,311) as compared with 1.1 million pounds (valued at US\$271, 118) for 1954.

Table 1 - Egypt's Canned Fish Imports by Country of Origin, 1954-55												
True Sardines Other Canned Fish!												
Country of Origin		1955			1954			1955		1954		
	Quantity	Va	lue	Quantity	Va.		Quantity	V a		Quantity	Va.	lue
	1,000 Lbs.	EL1,000	US\$1,000	1,000 Lbs.	EL1,000	US\$1,000	1,000 Lbs.	EŁ1,000	US\$1,000	1,000 Lbs.	EŁ1,000	US\$1,000
France	10	1.7	. 5	11	1.4	4	-	-	-	-	-	-
Japan	-	-	- 1	15	0.8	2	17,553	710.1	2,024	9,571	425.0	1,211
Morocco	88	7.0	20	143	9.8	28	-	~	-	-	-	-
Netherlands	-	-	- 1	-	-		230	11.0	31	449	21.6	62
Portugal	667	56.5	161	916	78.6	224	264	20.4	58	201	19.4	55
Union of South Africa .		-	-	-	-	- 1	769	24.9	71	12	0,8	2
United Kingdom	-	-	-	-	-	- 1	34	2.5	7	54	4.5	13
United States	-	-	-	-	-	- 1	62	2.2	6	121	5.1	14
Western Germany		- 1	-	- 1	-	-	118	4.8	14	147	7.1	20
Yugoslavia	22	1.7	5	39	3,2	9		-	-	-	- 1	-
Other Countries	26	2.0	5	12	1.3	4	349	18.2	52	104	7.7	23
Total	813	68.9	196	1,136	95.1	271	19,379	794.1	2,263	10,659	491.2	1,400
1/ Classified as follows: "Other ca	nned fish including	pilchard, mack	erel, anchovy, a	nd herring, but not	t including salm	on and tuna,"						

All other types of canned sardines are classified in the Egyptian official import statistics under the general heading "Other canned fish including pilchard, mackerel, anchovy, and herring, but not including salmon and tuna." Imports under this classification in 1955 amounted to 19.4 million pounds (valued at US\$2.3 million) as compared with 10.7 million pounds (valued at US\$1.4 million) for 1954. Of these "other canned fish" imports, by far the largest percentage is made up of pilchard and mackerel. In 1955, mainly because of the price factor, Japan supplied 91 percent of the total quantity imported under "other canned fish."

Imports of all canned fish from the United States are insignificant due mainly to Egypt's policy of preserving dollar exchange for other imports such as capital goods.

The most popular size can of true sardines purchased by 95 percent of the consumers is the $4\frac{1}{2}$ -oz. flat. Of the other types of canned sardines, about 80 percent

of the consumer's prefer the 5-oz. and 15-oz. tall sizes, 50 percent of the consumers prefer the 5-oz tall, 15 percent the 8-oz. tall, 30 percent the 15-oz. tall, and the balance other sizes.

About 75 percent of the true sardines consumed are packed in olive oil, 20 percent in vege-

Table 2 - Egyptian Retail Prices f	or Canned	Sardines	
Type	Price Per Can		
	Piasters	U. S.Cents	
True Sardines in Olive Oil:			
$4\frac{1}{2}$ -oz. Portuguese	3.7-4.5	10.5-12.8	
$4\frac{1}{2}$ -oz. Moroccan & other origin.	3.5-4	10.0-11.4	
True Sardines in Vegetable Oil:			
$4\frac{1}{2}$ -oz. Portuguese	3.5-4.3	10.0-12.3	
$4\frac{1}{2}$ -oz. Moroccan & other origin.	3.3-3.8	9.4-10.8	
Other Types of Sardine (Pilchard			
or Mackerel), Natural Pack:			
15-oz	5.7-6.2	16.2-17.7	
8-oz	3.8-4.2	10.8-12.0	
5-oz	2.6-2.8	7.4-8.0	

table oil, and 5 percent in tomato sauce. Of the other types of sardines consumed, 90 percent are packed natural, 8 percent in tomato sauce, and 2 percent in other condiments.

The percentage of true sardines consumed by the high and medium income groups is estimated at 60 and 40 percent, respectively. The percentage of other

types of canned sardines consumed by the medium and low income groups is estimated at 25 and 75 percent, respectively.

Prices of canned sardines are regulated by an Egyptian Government decree which provides that the prices paid by the consumer should not be above 16 percent of the landed cost of the goods, this 16 percent profit being divided by the importer, the wholesaler, and the retailer. The retail price for the $4\frac{1}{2}$ -oz. size of true sardines from Portugal ranges from 11-13 U.S. cents (see table 2).

An import license should first be obtained to make possible the importation of canned sardines or any other commodity. The import customs duty on canned sardines is 8 percent ad valorem plus a quay duty of 0.8 percent ad valorem.

The largest percentage of the business is done through importers who are at the same time distributors selling to wholesalers and sometimes to large retailers. These importers account for about 85 percent of the imports. The remaining 15 percent of the business is done through sales agents who book orders for direct shipment from the exporter to large local wholesalers.



Formosa

<u>CANNED SARDINE MARKET</u>: Since there is no domestic pack of canned sardines in Formosa, local consumption is satisfied entirely by imports, states a July 19 dispatch from the United States Embassy at Taipei.

Consumption of canned sardines has been decreasing considerably during the last few years due largely to reduced imports resulting from the Government import policy of discouraging importation of consumption goods and expanding the local fishing industry. The relatively high price, which includes a 60-percent import duty, also discourages consumption of this commodity which used to be consumed by the populace during the Japanese occupation of Taiwan. A further decline in consumption is anticipated in the future.

Formosa's Imports of Canned Sardines, 1954-55									
Countries of Ominin		1955		1954					
Country of Origin	Quantity	Val	ue	Quantity					
	Lbs.	NT\$ US\$		Lbs.	NT\$	US\$			
Japan	1, 164, 534	3,911,687	157,856	4,341,120	16, 182, 470	653,044			
Canada	-	-	-	1,457	4,972	201			
West Germany .	- '	-	-	992	11,472	463			
Korea	-	-	-	5	39	2			
United States	216	1,279	52	73	456	18			
Origin unknown.	84	1,353	55	_	-	-			
Total	1, 164, 834	3,914,319	157,963	4, 343, 647	16, 199, 409	653, 728			

Eighty percent of the consumers prefer the 15-oz. oval cans, and 20 percent the 7.5-oz. ovals. All of the canned sardines consumed in Formosa are packed in tomato sauce and are used only by the high-income group. This is because of the relatively high price on the local market, compared with the price of fresh fish. Retail market prices for the 7.5-oz. ovals are 30 U.S. cents a can and for the 15-oz. ovals, 46 cents a can.

Imports of canned sardines during 1955 amounted to 1.2 million pounds (valued at US\$157,963) as compared with 4.3 million pounds (valued at US\$653,730) during 1954. The majority of the imports during 1955 were from Japan with a small amount from the United States (see table).

Canned sardines are marketed through importers who sell to wholesalers, who in turn sell to retailers or grocers. In Taipei the larger wholesalers are in some cases also importers. Some wholesalers or importers of canned food also maintain retail outlets. Most of the importers are concentrated in Taipei.

Note; Values converted to US\$ equivalents at the official rate of NT\$24,78 equals US\$1.



France

FISH CANNING INDUSTRY AND CANNED SARDINE MARKET: Pack: The French fish canning industry in 1955 comprised 163 companies with 222 plants in operation. A total of 17,017 persons worked a total of 14 million hours in these plants. Salaries and wages totaled 1.9 billion francs (US\$5.4 million) for 1955.

Table 1 - France's Pack and End-of-Year Stocks of Canned Sardines and								
Sardinelike Fish. 1952-55								
Sardinelike Fish, 1952-55								
		-	. 1/		-		a	1/
Product		Pa	ck ¹ /		En	id-of-Ye	ar Stock	s='
Froduct	1955	1954	1953	1952	1955	1954	1953	1952
		(Metric Tons) (Metric Tons)						
C 1:	10 040			0.000		frize or I	C 1 0110)	
Sardines	10,340	20,900	16,960	9,660	2,422	8,932	5,200	15 100
Sprats & anchovies	530	706	120	1,900	2, 422	0,932	3,200	3,100
Mackerel	14, 126	12,380	10,886	10,094	2.348	2,043	2,200	1,300
Herring & pilchard		4,430				3, 210		
	Total 31,076 38,416 35,966 28,094 8,995 14,185 11,800 9,800 1/ Semigross weightweight including immediate container.							
- beingross weight weight	1/ Searingross weight weight including infinediate container.							

Canned sardines (including sprats and anchovies) comprised 19.3 percent of all fish canned in France in 1955, and 39.4 percent of the total in 1954. The corresponding percentages for both sardines and sardinelike fish were 54.4 percent in 1955 and 70.1 percent in 1954.

The pack of canned sardines and sardinelike fish in France during 1955 amounted to 31,076 metric tons as compared with 38,416 tons in 1954, according to a United States Embassy dispatch from Paris dated July 23.

<u>Consumption</u>: Canned sardines and sardinelike fish are consumed regularly at all income levels in France except the very lowest. The trade has estimated that only 16 percent of French families are not at this time regular consumers. Of these,

Table 2 - France's Estimated Consumption $^{1/}$ of Canned Sardines and Sardinelike Fish, 1953-55							
Туре	Consumption	Percentage of Con- sumption Supplied by Domestic Pack					
	1955 1954 1953	1955 1954 1953					
All sardines and sardinelike fish ² /. Only sardines, sprats, and anchovies 3/. [1] Semigrass velocity, weight including impediate out also	(Metric Tons) 52,281 51,984 56,219 34,233 34,970 40,133						

^{2/} Since this item in the French Tariff (Tariff Item No. 05-15-13) includes all types of canned fish except salmon and true sardines, it is not possible to obtain exact foreign trade data for mackerel, herring, and pilchard. Imports and exports of these have been estimated as percentages (8 percent of imports and 55 percent of the No. 05-15-13 for the years shown) suggested by representatives of the trade. Since countries outside the Franc zone account for a relatively small proportion of imports and those from North Africa do not include mackerel, herring, or pilchard, the 8-percent estimate is approximately confirmed by analysis of statistics.

^{3/} Production, plus imports, minus exports (Tariff Item No. 04-15-12) adjusted for change in year-end stocks.

only 8 percent are considered outside the ranks of potential consumers, for reasons of extremely low income, prejudice against conserved foods in general, or domicile in areas where freshly-caught fish is available daily at low prices.

In a market already so deeply penetrated, opportunity for horizontal expansion is therefore limited to 8 percent and any important increase in sales will depend upon vertical expansion, that is greater consumption by families which are already including canned fish fairly regularly in their diet. The trade has estimated that of 100 regular customers of canned sardine-type fish, 81 buy sardines repeatedly, 22 buy mackerel fillets repeatedly, and 20 buy herring or pilchard repeatedly, with the overlap of 23 percent being families which regularly consume two or more of the these products. In general, the market has been established by the true sardines,

Table 3 - Most Popular Can Sizes of Canned Sardines and Sardinelike Fish Marketed in France								
French Can	Wei	ght	Estimated					
Nomenclature		ntents	Percentage Marketed					
	Grams	Ounces	Percent					
Sardines: 1/								
1/15 P. 1/	46	$1\frac{3}{4}$	17					
1/10 P. Club 20	69	$2\frac{1}{2}$	20					
1/8 P	87	$1\frac{3}{4}$ $2\frac{1}{2}$ 3 4 $4\frac{1}{4}$	5					
1/6 P. 25	125	4	25					
1/4 P. Club 30 .	130	$4\frac{1}{4}$	9					
1/4 P. 30	173	6	11					
1/3 P. 40	232	$8\frac{1}{4}$ $12\frac{1}{4}$	9					
1/2 P	375		2					
1/1 P	750	$24\frac{1}{2}$	1					
Others	-	-	1					
Mackerels:2/								
1/6 P. 25	122	$4\frac{1}{4}$	16					
1/4 Club 30	127	$ \begin{array}{c} 4\frac{1}{4} \\ 4\frac{1}{2} \\ 6\frac{1}{2} \end{array} $	36					
1/4 P. 30	183	6 1 /2	24					
1/2 P. (longue)	367	13	8					
1/3 P. (longue)	245	83/4	16					
Pilchard-Herring:								
1/2 P. (ovale-								
pilchards)	367	13	3/					

^{1/} Also anchovies.

pensive than canned fish.

The spread of consumption is fairly even between income groups. The general average of somewhat over 80 percent of families has also been found to apply fairly evenly among rural, semirural, and urban groups, and through the several seasons. The stability of the market is prob-

ably due to the custom of serving a minor hors d'oeuvre course be-

fore the main dish of

each meal.

and sales of the other sardine-types are developing progressively among families which have acquired an appreciation of canned fish through the use of sardines. The other types are therefore more susceptible of horizontal expansion.

There is no evidence of a steadily increasing trend through the past three years, but representatives of the trade are confident that a gradual increase in per capita consumption can be realized, depending of course upon the prices of sardine-types relative to alternative foods. Most of the competing products for hors d'oeuvres are more ex-

Retail Prices: Retail prices of canned sardines (see table 8) are becoming somewhat erratic because of strong upward pressures: (1) the 1955 catch was hardly half that of 1954, which was by no means a record year; (2) adverse weather conditions during the winter 1955/56 sharply increased prices of vegetable oil and especially olive oil (the latter is from 50-150 percent more expensive); (3) a certain amount of speculation in wholesale sardines. Differences in prices for the same can size are also to be reckoned: (1) various cooking methods, (2) incidental transportation differentials.

The 1956 mackerel catch has been far below expectations. This will in all likel-hood send mackerel prices upwards in the same pattern as sardine prices.

^{2/} Massed on a market survey by the trade in 1952. Representatives of the trade affirm that conditions have not materially changed since that time,

^{3/} Most popular size.

Imports: In 1954, the last year for which a detailed breakdown is readily available, imports of canned true sardines from French Union sources were (in metric tons): Morocco 10,700; Algeria 4,061; Tunisia 1,278. There were no imports from the United States. The French Union sources enjoy a preferential position in the French market and the admission of sardines from Portugal is periodically negotiated as an integral part of the bilateral trade agreement (see table 9).

Nomenclature Weight of Contents Dimensions Canned 1/15 Grams Ounces $\frac{mm}{1}$ 99 x 46 x 18.5 Anchovies & Sardines 1/10 P. (Club 20) 69 $2\frac{1}{2}$ 104 x 59.8 x 20 Sardines 1/8 P 87 3 95 x 60 x 24	
Nomenciature Grams Ounces mm.	- 1
1/15	
$\begin{vmatrix} 1/10 \text{ P. (Club 20)} & 69 & 2\frac{1}{2} & 104 & x & 59.8 & x & 20 \\ 1/8 & P. & . & . & . & . & . & . & . & . & $	
$\begin{vmatrix} 1/10 \text{ P. (Club 20)} & 69 & 2\frac{1}{2} & 104 & x & 59.8 & x & 20 \\ 1/8 & P. & . & . & . & . & . & . & . & . & $	nes
1/8 P 87 3 95 x 60 x 24 "	
1/07 05 10 11	
1/6 P. 25 115 4 105 x 76 x 24 "	
1/6 P. 25 122 4½ 105 x 76 x 24 Mackerel fillets	
1/6 P. ovale 115 4 105.2 x 64.7 x 30.5 Sardines	
$1/6 \text{ P. Club } 30$. 115 $4\frac{1}{4}$ 104 x 59.8 x 28.5	
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	1
1/4 P. 30 173 6 105 x 76 x 31.5 Sardines	
$1/3 \text{ P. } 40 \dots$ 232 $8\frac{2}{4}$ 154 x 55 x 40 Sardines	
1/3 P. (Sardines) 232 8½ 115.7 x 94.6 x 32 "	
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	
$1/2$ P. (Sardines) 348 $12\frac{1}{4}$ 115.7 x 94.6 x 43.5 Sardines	
1/2 P 367 13 115.7 x 94.6 x 43.5 Mackerel (whole)	
$1/1$ P. (Sardines) 697 11b. $8\frac{1}{2}$ 115.7 x 94.6 x 81 Sardines	
$1/1$ P 735 11b. $9\frac{3}{4}$ 115.7 x 94.6 x 81 Mackerel (whole)	
3/1 P. (Sardines) 2,094 41bs.10 205.3 x 120.4 x 104 Sardines	
$3/1$ P $2,205$ $4 lbs. 13\frac{3}{4} 205.3 \times 120.4 \times 104 Mackerel (whole)$	
Tall Rectangular:	
$1/3$ P. (longue). 245 $8\frac{3}{4}$ 154.1 x 55.4 x 40 Mackerel (whole)	
1/2 P. (longue). 367 13 196.2 x 55.4 x 45 Mackerel (whole)	
Ovals:	
1/6P. (Oyale	
Poisson) 115 $4\frac{1}{4}$ 105.2 x 64.7 x 30.5 Mackerel (whole)	
1/2 P. (Pilchards) 367 13 160.5 x 108 x 37.5 Pilchards (or herr	ing)
1/1 P. (Pilchards) 735 1 lb. 10 160.5 x 108 x 65 Pilchards (or herr	
Source: Institut National de la Conserve.	-11g/

The exact volume of other sardine-type (mackerel, herring, pilchard, etc.-ltem 04-15-13) imports is unknown because all canned fish other than salmon and true sardines are com-

true sardines are combined in one tariff item. The trade representatives consulted have estimated that only 8 percent of the import trade in this item consists of sardine-types and states that the principal sources of these are Norway, West Germany, the Netherlands, and the United Kingdom, all OEEC countries with which France conducts bilateral trade negotiations.

Table 5 - Packing Media for Canned Sardines and Sardinelike Fish Consumed in France, 1/1952-55							
Packing Media Percentage of To Consumption				1			
	1955	1954	1953	1952			
(%)							
Oil	39	50	46	45			
Tomato sauce	11	8	11	10			
Natural	29	24	22	25			
Marinade (white wine sauce).	21	18	21	20			
Total	100	100	100	100			
1/ Based on a market survey made by the trade in 1952. Trade representatives affirm that conditions have not materially changed since that time.							

<u>Distribution</u>: The production of sardine-type canned fish is generally sold by the canners direct to the retail outlets through salesmen operating throughout the country. Single orders from canners are generally in lots of full cases (one case containing 100 cans).

Table 6 - Trade Estimates of Packing Media for Canned Sardines and Sardinelike Fish by Type of Fish, 1955							
Packing Media Percentage of Total Consumption Sardines Mackerel Herring Pilc							
Vegetable oil (other than soya oil) . Olive oil ¹ / Tomato sauce White wine Tomato and oil sauce	54 42 4		58 - - 42	100			
Total							
1/ Olive oil percentage will presumably be lower for 1956 because of adverse weather conditions which brought about a sharp increase in price causing many canners to switch to vegetable oil (mostly peanut oil).							

For small orders, that is, by dozens of cans of any of the categories of sardine-type canned fish, retailers are supplied by local wholesalers which number about 2,000 throughout France. Restaurants and other large users generally apply either to the canners or to local wholesalers, according to their requirements, rather than to retailers. Chain-store purchasing offices deal direct with the canners.

About 12 important food-product wholesalers in the Paris area are handling and controlling the whole of the import business in France. They are operating

Table 7 - French Consumption of Canned							
Sardines and Sardinelike Fish by Income							
Groups and by Type of Fish							
Type Income Over-All							
of Fish High Middle Low Average							
	(Percentage Buying Each Type						
	of Pr	oduct in	Each (Group%)			
Sardines	85	82	76	81			
Mackerels	23 23 20 22						
Herrings	9 10 10 10						
Pilchards	5	11	14	10			

along lines somewhat similar to those used by the canners, sending salesmen throughout the country. Some of them keep stocks for redistribution in the main cities of France. Many have exclusive agencies for definite makes of canned food products.

Sardine-type canned fish is considered a standard item of the retail grocery business, and there are 213,000 retail grocers

(212,866 in 1954) throughout France. This figure includes some 29,550 retail outlets of 102 chain-store groceries. In addition about 23,000 pork-butchers ("charcuteries") and about 6,000 fish dealers also sell sardine-type canned fish to supplement their specialties.

Government Purchase of Sardines: The French government purchases regularly sardine-type canned fish for the Armed Forces and Administration. The tonnage of canned fish purchased in 1954 (last typical year) was about 2,900 metric tons (i.e. about 7.5 percent of the 1954 sardine-type production). The armed forces which account for 80 percent of these purchases are expected to require increased amounts in the immediate future because of the North-African operations. Should the expected 1956 stock deficit affect the French Government's ability to meet its normal requirements, emergency import measures (outside normal trade) would then be resorted to; Portugal, Morocco, and Spain were mentioned by the trade as the most likely sources of supply if this should occur. As a rule, Government purchases are conducted through competitive bidding from canners who are requested each quarter-year by the several purchasing agencies to submit bids. These re-

quests for bids are publicized through official government organs, posters, and circulars to trade associations and chambers of commerce. A team of government experts controls the bidding and adjudication.

Table 8 - French Retail Prices for Canned Sardines and Sardinelike Fish										
G G:		Packin	g Media	and Price P	er Can		Contents			
Can Size	Veget	able Oil		ve Oil		mato	Weight			
	Francs	U.S.¢	Francs	U.S.¢	Francs	U.S.¢	Ounces			
Sardines:										
1/15 P	38- 45	10.9-12.9	68- 78	19.4-22.3	n.a.	n.a.	$1\frac{3}{4}$			
1/10 P. Club 20	55- 80	15.7-22.9	88- 98	25.1-28.0	n.a.	n.a.	$2\frac{1}{2}$			
1/8 P	92	26.3	138	39.4	n.a.	n.a.	$3\frac{\Gamma}{4}$			
1/6 P. 25		24.3-28.6			73	20.9	4			
1/6 P. Club 30		22.9-32.9			120-160	34.3-45.7	$4\frac{1}{4}$			
1/4 Club 30		22.9-31.4			n.a.	n.a.	$1\frac{3}{2}\frac{1}{1}$ $2\frac{1}{1}$ $3\frac{1}{4}$ $4\frac{1}{4}$ $4\frac{1}{4}$ $8\frac{1}{4}$ $12\frac{1}{2}$			
1/3 P. 40	158-220	45.1-62.9		57.1-64.3	n.a.	n.a.	81/4			
1/2 P	-	-	390	111.4	n.a.	n.a.	$12\frac{1}{2}$			
	Whi	te Wine	Conten	ts Weight						
	Francs	U.S.¢	Ounces							
Mackerels:										
1/6 P. 25	60- 80			4						
1/6 P. Club 30	60- 85			$4\frac{1}{2}$						
1/4 Club 30		18.6-24.3	$4\frac{1}{4}$							
1/4 P. 30	75 - 85		4½ 4¼ 6½ 8¾							
1/3 P. 40		28.6-32.9								
1/2 P. (longue)	140-155	40.0-44.3	1	.3						
	Whi	te Wine	Veget	able Oil	Conten	ts Weight				
	Francs	U.S.¢	Francs U.S.¢		Ounces					
Herring:										
1/2 P. (longue)	240	68.6	200	57.1	13					
1/4 Club 30	140	40.0	n.a.	n.a.	$4\frac{1}{2}$					
	Tomat	o and Oil	Conten	ts Weight						
	Francs	U.S.¢	Ounces							
Pilchards:										
1/2 P. (Pilchards)	80-110	22.9-31.4	1	.3						
1/ Represent averages for stoo	cks of the pas	t two seasons,	n.a no	ot available,						
	a region of the state of the st									

<u>Prospects</u>: Because of exceptionally low production of fresh sardines in 1955 a deficiency has been accumulating in the stocks of canned sardine-type fishes which is expected to be 4,500 metric tons (below normal) as of the start of the 1956 selling campaign in August. The estimated amount of deficiency applies to both

Table 9 - France's Imports of Canned True Sardines, 1/ 1952-55											
Item	1953	1952									
ValueTotal	Million Francs	5,066	4,452	5,582	5,354						
ValueTotal	US\$1,000	14, 474	12,720	15,949	15,297						
QuantityTotal	Metric Tons	17,333	17,817	23,672	23, 259						
By Country of Origin: French Union Portugal Other Countries	Metric Tons	14,489 2,832 12	16,039 1,778	21, 102 2, 570	21, 381 1, 865 13						
1/ Tariff Item 04-15-12, sardines, sp	rats, and anchovies.				10						

cannery and wholesale stocks. The trade reports that the accumulating short supply position threatens to result in price increases which might be as high as 20 percent. Partial relief from this situation can be expected through a shift from true sardines to other sardine types but the leading beneficiary of such a shift in consumption pattern is more likely to be tuna which has a more stable market because

the catch is not subject to as many hazards as sardines. The situation appears in principle to call for an increase in imports of sardine-type fishes in the coming months.

So far as the prospects of imports from the United States are concerned, if prices are competitive the principal obstacle is likely to be the over-all Government program of regulation of dollar imports. It may be assumed that as large a part as possible of the additional requirements will be obtained from French Union sources, particularly North Africa. The Western European countries also enjoy advantage over the United States as a source of supply because under the system of reciprocal agreements imports from these countries are presumed to influence favorably the level of their imports from France, whereas the licensing of additional imports from the United States only add to France's already heavy dollar trade deficit.

Note: Values converted to US\$ equivalents at the rate of 350 French francs equal US\$1.

* * * * *

REVIEW OF THE FISHERIES, 1955: The French fish catch for 1955 (505,000 metric tons, including salt cod), was a record 15,000 tons over 1954. Deep-sea fish continues to provide the bulk, and the tonnage caught grows every year due to better conditions and improved techniques. Catches of other types of fish remained more or less stable.

Prices throughout remained stable and demand kept pace with increased quantities, because of the shortage of pilchards, herring, and tuna.

Imports of fresh fish were up by 2,500 tons in 1955, but salt and smoked imports fell. The importation of shellfish showed an important increase, due to its liberation from quota restrictions. One notable tendency was the increase in imported fillets, which jumped from 2,800 to 2,900 tons.

On the export side, salt cod continued to lead with 32,380 tons, but other types, including fresh fish, showed little or no increase, reports <u>World Fishing</u> of July 1956.



French West Africa

<u>CANNED SARDINE MARKET</u>: There is no local fishing for sardines and no sardine canning industry in French West Africa, states a June 27 dispatch from the United States Embassy at Dakar.

A good indication of the consumption of canned sardines in French West Africa is given by the imports for the first three months of 1956, which amounted to about 503 metric tons (valued at US\$290, 925). Morocco was the principal supplier with 485 tons, and the balance was supplied by France, Portugal, Algeria, West Germany, and Denmark. It is evident that data for such a short period do not reflect seasonal consumption trends. Consumption is probably increasing as Africans learn to enjoy European foods. In fact, lower quality, cheaper sardines (largely from Morocco) have a large sale among the Africans.

The most popular size of canned sardines is the $4\frac{1}{2}$ -oz. (125 grams) can. From time to time, one can obtain other sizes but by far the majority of the imports are the $4\frac{1}{2}$ -oz. size.

By far the most popular packing medium is refined peanut oil. A small percentage of the imports also are packed in tomato sauce and some of the higher-cost ones are packed in pure oilve oil (from France and Portugal). There is also one brand of "luxury" sardines on the market from France packed with truffles and various spices. Packing with mustard sauce or brine is not popular locally.

A great majority of the imported sardines is consumed by the French residents (only 0.4 percent of the total population), although the few of the Africans who are beginning to acquire European tastes also buy them.

The retail market price for the $4\frac{1}{2}$ -oz. can of sardines packed in tomato sauce and in peanut oil from Morocco is 17 U.S. cents a can, and in peanut oil from Portugal is 20 cents. The same size can of high-quality sardines, skinless, boneless, and packed in pure olive oil from Portugal is 37 cents, and the same type pack from France is 49 cents. The price of the "luxury" quality sardines packed in pure olive oil with truffles, spices, and other condiments from France is 66 cents.

Because of the necessity to conserve foreign exchange, import permits and foreign currency are ordinarily not allowed for imports of food items. Imports from countries outside the French Union are allowed because they are included in barter trade agreements with France. Therefore, there does not at present appear to be a market for American exports to French West Africa. When a trade agreement has been concluded between France and other countries providing for imports of sardines, a public notice is given asking all importers interested in buying from that country to notify the Government authorities as to the amounts they wish to purchase. Allocations of import permits are then made proportionately to the total quantity to be allowed.

* * * * *

ALBACORE TUNA FISHING: Commercial fishing for tuna in French West Africa was started late in 1955. From November 30, 1955, to May 20, 1956, the catch was 1,700 metric tons of albacore tuna, points out a July 30 dispatch from the United States Consulate at Dakar. This tonnage compares with the results shown in France by a port such as Douarnenes (1,980 tons of tuna during the last season), but the fish from tropical waters is considered superior. At Douarnenes 96 boats fished for tuna while at Dakar only 7 boats caught the amount indicated.



German Federal Republic

INAUGURATION OF 1956 DEEP-SEA FISHING SEASON: The fourth annual postwar "Day of the Deep-Sea Fisheries" was held in Cuxhaven July 14-15 to celebrate the opening of the West German fishing season. Guests included high Federal and Land officials and foreign government representatives. A series of ceremonies and celebrations highlighted the official opening of the 1956 West German fishing season. This year the event took place in Cuxhaven, one of the four major home ports of the West German trawler fleet. The month of July is chosen for the event because trawler companies have then finished the annual over-haul of a large part of their fleet in preparation for the herring season.

The opening of this year's deep-sea fishing season began July 14, 1956, with a religious service in memory of the fishermen who lost their lives on the high seas during the past year. There followed a tour of inspection of the fishery port of Cuxhaven, the West German fisheries research vessel Anton Dohrn, and of the visiting Belgian and Dutch fisheries service vessels.

Federal Minister Dr. von Merkatz stated that the Federal Government intends to continue its active support of the West German deep-sea fisheries, mentioning in this regard the current improvement of the government's fisheries protection service. He also recommended that steps should be taken to intensify the training and education of young fishermen. At a press conference Dr. Dierks, executive manager of the Federal Association of Deep-Sea Fisheries, announced that DM450,000 (US\$107,000) are being allocated to such a training center for groups of 240 prospective fishermen. The school will be located in Bremerhaven.

With regard to future developments in the fishing trade the tenor of the speeches was that government intervention should be kept to a minimum. The most important task facing the trade today, according to the speakers, is the improvement of the quality of fish products so as to develop a greater outlet for an increasing production by the German fisheries, according to the United States Consulate at Bremen (July 30, 1956).



Gold Coast

 $\underline{\text{CANNED}}$ SARDINE MARKET: It is impossible to obtain statistics on sardine consumption in the Gold Coast, according to a United States Embassy dispatch of June 21, from Accra.

Sardine consumption has always been high with the African population who use them in mixtures of rice and other local crops in the preparation of native dishes. Tall and rectangular cans are seldom found in stores, the $4\frac{1}{2}$ -oz. flat and 8-oz. oval are the popular sizes. The most popular medium of packing is in oil, generally vegetable, as this lends itself well to the preparation of the native dishes. It is estimated that better than 95 percent of the sardines sold in the Gold Coast are packed in oil and are consumed by the low-income group. They prefer the cheaper vegetable-oil pack, as olive oil is more expensive.

The Gold Coast is a member of the sterling area, and in accordance with the monetary policy of that area, unrestricted expenditure of dollars on goods readily available from within the sterling area or from O.E.E.C. countries is not permitted. On occasions, surplus of dollars permit sporadic importation from the United States of items such as canned fish, but this trade should not be considered as an important export outlet for American producers.

Practically all distribution is through extremely large concerns. These concerns sell in quantity to "Mammy Traders," who receive a commission from the large dealers and they in turn sell to lesser traders. These products eventually reach the most primitive areas of the country. The National Government and the Gold Coast Armed Forces occasionally ask for tenders on large quantities of food-stuffs,



Iceland

FISHERIES TRENDS, JANUARY-JULY 1956: The Icelandic North Coast herring season as of June 30, 1956, was three times that of last year, and the summer ocean perch fishing was excellent, points out a United States Embassy dispatch (August 9) from Reykjavik. The total Icelandic fish catch through July 31 this year was 321,000 metric tons in comparison with 286,000 tons for the same period in 1955. Herring accounted for most of the increase. The outlook for frozen fish shipments to the United States is reported as somewhat improved.

The larger-than-usual carryover of export stocks of fishery products existing at the end of 1955 was eliminated during the first half of 1956 since exports were

24 percent higher than in the same period a year earlier. Stocks as of June 30 were at approximate-by last year's level. Most of the increase in exports was in shipments of frozen fish, with the bulk of the increase destined for the Soviet Bloc. It is reported that 84 percent of Iceland's total Soviet Bloc trade was in frozen fish.

The only other volume market for frozen fish continued to be the United States. Exports of frozen fish to the United States has increased from 6,000 metric tons for the first half of 1955 to 7,200 tons for the first half of this year. On the other hand, frozen fish shipments to the Soviet Bloc increased from 16,000 tons to 22,300 tons during the same period. While shipments to the



Iceland herring exports.

United States are up, sales may or may not be since frozen fish is actually sold exwarehouse after it arrives in the United States. The increased shipments may reflect in part the tight storage situation in Iceland.

Table 1 - Iceland's Estimated I	Production of
Frozen Fish, January-Jur	ne 1956
Species	Quantity
	Metric Tons
Cod fillets	24, 172
Haddock fillets	1,906
	902
Ocean perch fillets	5,208
Coalfish fillets	396
Ling fillets	53
Flounder fillets & whole frozen	167
Total January-June 1956	32,904
Total January-June 1955	33, 175

LARGE NUMBER OF FILLETING AND SKINNING MACHINES
PURCHASED: Iceland will receive
delivery of 17 automatic filleting
and skinning machines in 1956 and
40 in 1957. These are being purchased under a DM7-8 million
(US\$1.7-1.9 million) export credit
obtained in Western Germany.
Since each of these machines will
replace 18 to 20 high-cost filleters, this acquisition should constitute a significant step towards
lowering costs and improving Ice-

land's competitive position in frozen fish. It will also, presumably, increase total output and, unless exports improve, aggravate the frozen stocks problem.

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NEW TRAWLERS ORDERED FROM WEST GERMAN SHIPYARD: The City of Reykjavik has contracted with a West German shipyard in Bremerhaven to build, for delivery early in 1958, Iceland's largest trawler. The new 800-ton vessel will carry a crew of 48 men and cost close to US\$774,908 (IKr. 12.6 million). A similar contract was signed in the spring of 1956 by the town of Neskaupsstadur. The two new trawlers will replace two that were wrecked in 1955. The additions will bring the trawler fleet up to 46 vessels, states a July 6 United States Embassy dispatch from Reykjavik.

The Bremerhaven shipyard was selected over the shipyards of several other countries because of favorable terms and quicker delivery.

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NORTH COAST HERRING SEASON: The previously booming North Coast herring season blew away on July 25 in a blast of Arctic wind that lasted ten days and deposited snow on Iceland's northern passes. As a result the herring overnight deserted the surface and the Icelandic hopes for its return en masse are waning.

Whereas the catch in the single week ending July 21 was about 30,000 metric tons, that for the following week was 11,000, and that for the week ending August 4 only 1,000. The weather improved, but the catches did not and increasing numbers of boats were reportedly giving up and departing for the South Coast.

Icelandic North Coast Herring Catch Through August 4, 1956, with Comparisons									
	19	55							
	Barrels	Metric Tons	Barrels	Metric Tons					
To reduction plants	244,894	33,061	22,087	2,982					
For salting	257,003	34,695	155,773	21,029					
For freezing	9,394	939	8,017	802					
Total	511, 291	68, 695	185, 877	24, 813					

An additional contract for 50,000 barrels of salted North Coast herring has been signed with the Soviet Union and accordingly salting operations (for such herring as is now being caught) have been resumed. The final total of North Coast contracts stands as follows: U.S.S.R. 150,000 barrels; Sweden 60,000-70,000 barrels; and Finland 75,000 barrels. Other sales will be so small as to be almost negligible.

The South Coast herring season began and first catches were reportedly good. Contracts in hand total 60,000 barrels, or 25,000 less than last year. This results from the fact that 25,000 barrels of the Russian South Coast contract was, as the contract authorized, filled with North Coast herring. At present the orders stand: 50,000 barrels for the U.S.S.R., and 10,000 barrels for Poland.

* * * * *

REVIEW OF THE FISHERIES, 1955: The total Icelandic fish catch of 1955 was 409,000 metric tons, 5.5 percent above 1954. Apart from herring, the total fish catch was greater than in any previous year. The increase was due mainly to the ocean perch catch by the trawlers which rose about 21.2 percent as compared with 1954. At the same time the motor fishing boats increased their total catch by 6.3 percent as compared with 1954. Despite the fact that the herring season of 1955 in North Iceland gave very poor results, the herring catch proved to be 10.4 percent above the 1954 catch when the herring season was a total failure. The herring fisheries off the south and west coast of Iceland gave fairly good results and lasted longer than in many a previous year.

Principal changes in fish processing: the salt-fish production rose by nearly 24 percent and the production of stockfish by about 12.5 percent, but the production of frozen fish dropped by 5 percent.

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WINTER FISHING SEASON, 1956: The catch during the first two months of 1956 was considerably below the same period of 1955, and slightly lower than in 1954. The total catch was 23.9 percent below the first two months of 1954, the trawlers doing considerably worse than the motor fishing boats. The reduced trawler catch, however, was due to the fact that the season did not begin until January 24. In February the trawler catch was well above February 1954.

The trawlers the early part of 1956 had by and large had a poor season, both on account of unfavorable weather conditions and poor catches. The situation did improve about the middle of April, however.

The delay in the start of the season was due to the fact that the operators of the trawlers declared that they were not in a position to operate their vessels because of rising operational costs. Accordingly they sought a new agreement with the Government for a more favorable working basis for their vessels. As no agreement was forthcoming at the end of 1955, there was a stoppage which lasted until January 24. The new agreement, reached on January 21, provided for special measures in support of the fisheries, says the January-April issue of Fjarmalatidindi.



<u>DRIED SHRIMP INDUSTRY FACING CRISIS</u>: The century-old shrimp industry of Kerala (Travancore-Cochin and Malabar) is facing a crisis as a result of the Government of Burma's complete ban on imports of dried prawns from outside Burma except from the mainland of China, effective July 3, 1956.

For over 80 years Burma has been the chief customer of Kerala's shrimp, consuming about 90 percent of Kerala's annual production of about 10,000 metric tons. But in recent years, owing to the shifting of Burma's import policy from time to time, placing shrimp on the open general license list at one time and on the restricted license list at another, the fortunes of the Kerala shrimp industry have been fluctuating. A Burmese Purchasing Mission visited India in February 1956 and the orders placed by the Mission included dried prawns worth Rs. 24 lakhs (US\$504,000). This order reportedly helped the clearance of accumulated stocks of dried prawns in Kerala.

The President of the Travancore-Cochin Prawn Curers' Cooperative Marketing Society-1, a prominent society engaged in the trade, in a recent statement issued to the press, has brought out the serious situation in the trade at present. He stated that with Burma's latest order totally banning all imports of dried prawns except from China, with the season for the catch of shrimp now in full swing on the west coast and with a contract entered into by Burma with the Society expiring on July 31, 1956, the shrimp industry was facing a crisis.

The Society President clarified a misunderstanding in certain quarters that the trade in shrimp could easily be directed to the United States, which had started to buy large quantities of Indian shrimp. He explained that America was taking large-size frozen and raw shrimp, while the Burmese market's demand was for ordinary dried small shrimp. He added that shipments of shrimp to America were started only last year and lack of cold storage and other facilities had hindered development in that direction.

The Madras State Fisheries Marketing Officer explained that shrimp shipped to Burma belong to a particular species, very small compared to the large shrimp exported to the United States and that it was naturally impossible for that particular variety to grow bigger in size to suit the latter trade.

1/ The Travancore-Cochin Prawn Curers' Cooperative Marketing Society has a membership of 300 with a share capital of Rs,30,000 (US\$6,300). One-third of the total exports of prawn in 1954/55 season was done through the society. The society pays 75 percent of the market rate to the producers and curers at the very initial stage, payment being completed after sales.

* * * * *

FIRST FREEZER VESSEL TO HANDLE SHRIMP: The first quick-freezing vessel to operate along the west coast of India has arrived in Bombay from the United States, points out the July 1956 World Fishing. This 115-ton vessel, the M/V Judith, has a quick-freezing capacity of 4 tons a day and additional cold-storage facilities for approximately 70 tons of fish. It has been commissioned by an Indo-American venture.

The vessel will be completely manned by Indian personnel, and will move from port to port along the coast, collecting fish and freezing it on the spot. The main catch will be shrimp. In many cases she will deliver her cargo directly to oceangoing vessels destined for foreign ports, but some will be unloaded at cold-storage plants on shore operated by the company.

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NEW FISH FREEZING PLANT PROPOSED: The installation of a quick-freezing plant for preserving fish near Quilon, Travancore-Cochin, India, was announced recently by the Director of the Indo-Norwegian Fisheries project at Neendakara. He estimated the total cost of the freezing plant and the ice factory now under construction at Rs.500,000 (US\$105,000). The ice factory with a capacity of 25 tons of ice a day is expected to store 300 to 400 tons of fish at a time.

A fishery expert of the Norwegian Foundation, who had been away on a threeweek visit to the United States for exploring the market for Indian west coast shrimp, was returning to Quilon, reports a United States consular dispatch (August 2) from Madras.

Japan

CANNED SALMON PACK AND SALES PLAN FOR 1956: According to a preliminary estimate by the Japanese fishing industry, approximately 2 million cases



of canned salmon are expected to be packed by the industry this year. Floating canneries or mothership operations are expected to pack 1,620,000 actual cases; shore canneries are expected to pack from coastal salmon 250,000 cases and from high-seas salmon 150,000 cases; a grand total of 2,020,000 cases.

The carryover from the previous year's pack amounts to some 100,000 cases, making a total available for sale of approximately 2,120,000 cases of which 1,700,000 are ex-

pected to be exported and 400,000 cases to be sold on the domestic market. Members of the industry indicate that the outlook for placing the entire amount available is good both on the export and domestic markets. It is estimated that approximately 500,000 cases will be sold in the United

States and the same amount in the United Kingdom and 700, 000 cases to all other countries, reports an August 24 United States Embassy dispatch from Tokyo.

Type		Average 1955
		48-1-lb. Cans)
Chum .	\$16.75	\$14.00
Pink		16.50
Silver .	24.00	24.00
Red	31.00	30.00

This year's pack had been estimated at 3 million cases before the Russian re-

strictions were placed on fishing in the North Pacific and Okhotsk Seas. Last year's pack amounted to 1,780,000 cases. Comparative f.o.b. prices for 1956 and 1955 for canned salmon are found in the table.

* * * * *

Fishing Area	Catcher Boats	Motherships
Okhotsk	59	2
East of Kamchatka.	447	14
South of 480 N	509	-

NORTH PACIFIC HIGH
SEAS SALMON FISHING DE-
VELOPMENTS: The number of
Japanese motherships and catch-
er boats reported to have re-

received valid fishing licenses from the Russians to fish in the Russian restricted area is as shown in the above table.

The total salmon catch in the unrestricted area of the Aleutians and Bering Sea, according to unofficial sources, amounted to 25 million fish as of July 20. Official figures on the catch have not been released, points out an August 14 United States Embassy dispatch from Tokyo.

The total quota of 65,000 metric tons allowed in the Russian restricted area was not filled by the August 10 deadline. The Japanese Government had earlier requested an extension of the deadline in case quotas were not filled.

The Soviet Union through its Fisheries Mission in Tokyo gave a negative reply to Japanese requests for an extension of the August 10 deadline for salmon fishing

in the Russian Restricted Area in the North Pacific and Okhotsk Sea and Japanese fleets were ordered to return to their home ports. Only two fleets out of a total of 16 that participated returned to port with full quotas. These two had operated in the Okhotsk Sea. The remaining 14 fleets operating in the area East of Kamchatka fell short of filling their quota for the area by four million salmon. Failure to fill the quota is attributed to the fact that the Russians delayed in granting licenses, so that there were only 27 days of fishing before the August 10 deadline.

Fishing Area	Millions of Fish
Mothership Operations:	
Okhotsk Sea	10.9
North of 48° N. latitude, east	
of Kamchatka (Aleutians)	18.0
· Shore-based Fishing Boats:	
South of 480 N. latitude in re-	
stricted area	6.5
Total Russian Restricted Area	35.4
Mothership Operations:	
Aleutian and Bering Sea	25.0
Shore-based Fishing Boats:	
Coastal Waters	6.5
South of 480 North Latitude in	
Unrestricted Area	9.0
Total Unrestricted Areas	40.5
Total Both Areas	75.9

One fleet of one mothership and 27 catcher boats, which had operated in the Kurile Straits area, returned to port on July 30 with its limit, reported to be worth ¥410,000,000 (US\$1,137,000).

The Japanese 1956 pelagic and coastal salmon catch according to unofficial sources will be approximately as shown in the above table.

The following table gives official figures of the Japanese salmon catch by North Pacific mothership-type fishing only, by species, as of July 31, 1956.

Species	1,000 Fish						
Red	9,060						
Chum	19, 140						
Pink	15,000						
Silver	3, 250						
King	120						
Total	1/46,570						
1/ Excludes the coastal salmon catch							
and the catch b							
catch-boat ope	rations.						

The catch by mothership-type operations for 1956 was some 12 million salmon short of the mothership-type catch by 14 floats last year. While the catch is smaller than during the previous year with a larger total investment for the fishing companies and while the fleets failed to fill their quotas in the restricted area by four million salmon, the recent increase in salmon prices (up to 20 percent for salted and frozen fish and 5 percent for canned fish) may counteract the smaller catch.

* * * * *

COSTS OF JOINT UNITED STATES-JAPANESE CANNED TUNA ADVERTISING STUDIED: The Japanese Fisheries Agency has hired Dentsu & Co., an international advertising firm, to study costs and other aspects of the proposed joint United States-Japanese tuna advertising campaign in the United States. The firm is compiling statistics on tuna imports, production, and consumption together with information

on the ways canned tuna is served in the United States. The Fisheries Agency reported that details of the agreement have not yet been settled but information is being gathered which will be helpful in any subsequent developments relating to the scheme, states a United States Embassy dispatch from Tokyo dated August 10, 1956.

* * * * *

CANNED TUNA EXPORTS TO UNITED STATES: The Japanese Government announced that as of August 11 validations of tuna exports destined for the United States would be suspended. It is understood that the suspension is for the purpose of developing a new quantitative allocation for each exporter, which is currently under discussion between the exporters and the Government and will be based on exports since 1950.

A quota of 1.6 million standard cases will be shipped to the United States between August 1956 and July 1957 and will be divided among 44 exporters who have export records. Hitherto canned tuna exports to the United States were controlled by eight major firms and the balance to the other firms, points out an August 10, 1956, United States Embassy dispatch from Tokyo.

* * * * *

MEASURES TAKEN FOR ORDERLY MARKETING OF CANNED TUNA TOUNIT-ED STATES: The Japanese Government is taking measures to assure the orderly

marketing of canned tuna to the United States. Heretofore producers who are not members of the Canned Tuna Export Association were under no direct control. The new system restricts production by nonmembers of the Association to 20,000 cases for export to the United States market out of a total production allocation of 1,620,000 standard cases for the United States market in Japanese fiscal year ending July 1957. Only canned tuna in brine will be authorized for shipment to the United States.

At the same time allocations will be made to exporting firms on the basis of each one's historical position as supplier and on the basis of ability to perform. While the number of exporters is potentially as high as 44, it is expected that many will have allocations too small to be commercially practical and their export rights will probably be sold to major exporters (permitted under the regulation). Hence the final number of exporters may not greatly exceed last year's total of 14. All sales to exporters are to be channeled through the Tokyo Tuna Sales Company subject to provisions of the Fisheries Export Promotion Law regarding



Slicing tuna for canning in cannery located in Hiroshima, Japan,

prices and sales methods. Japanese believe regulations will prevent price cutting in United States market.

Canned tuna export permits were suspended until regulations are legally processed, scheduled about the end of August, states an August 25 report from the United States Embassy in Tokyo.

According to the Japan Canned Fish Exporters Association, during the year which ended July 31, 1956, a total of 1,450,000 cases of canned tuna in brine were exported to the United States and 560,000 cases of tuna in oil to Europe.

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TUNA FISHERIES RESEARCH COUNCIL ESTABLISHED: A tuna fisheries research council consisting of 25 members, all of whom are experts drawn from various sectors interested in tuna, including universities, has been organized by the Japanese Ministry of Agriculture and Forestry. The Council will study and carry out research on tuna resources, production, and sales as they relate to the Japanese economy, states a August 24 dispatch from the United States Embassy in Tokyo.

The establishment of the council grew out of a realization that an over-all clearcut policy on tuna fishing from catch to consumption is a pressing need both for the industry and for the Japanese economy. Such a policy, the Government feels, is essential to the stable development of the industry. The Council's emphasis in its initial stages will be on matters concerning the conservation of resources and the development of new ones. The Council will also give consideration to helping the industry improve productivity, expand domestic sales, and increase the export of tuna products. The new organization should not be confused with the Tuna Export Council, which was organized by the tuna industry on a private basis and handles export matters with the United States.

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TUNA VESSELS TO FISH IN AFRICAN WATERS: The Japanese are sending fishing vessels to African waters to catch tunny, and Prof. J. L.B. Smith, the ichthyologist, of Rhodes University, Grahamstown, Union of South Africa, has suggested that African territories should combine to arrange for part of the Japanese catch to be sold in Africa. His plan is that a refrigerator ship should cruise among the Japanese fishing craft off the coast and buy fish for South Africans. Both sides might make a good bargain.

Professor Smith holds that too much South African fishing is of the inshore type, and has suggested that South Africa employ a group of Japanese to pass on their highly developed skills and knowledge to the home industry, announces the July 1956 World Fishing.

* * * * *

FISHERY PRODUCTS LEAD IN FOOD PRODUCTS EXPORTED TO UNIT-ED STATES IN 1955: Fishery products were among the leading food products exported to the United States by Japan in 1955. According to the Japanese Ministry of International Trade and Industry, food products exported from Japan in 1955 had a value of US\$93.1 million. Of this total there were exported to the United States products valued at US\$37.6 million, almost 40 percent of the dollar value of the total Japanese food exports. The importance of the United States as an outlet for frozen and canned tuna is brought out in the table.

Japan's Food Exports to the United States Compared with Total Food Exports in 1955										
	Total Ja		Expor							
Commodity	Expo	orts	United States							
	Qty.	Value	Qty.	Value						
	Metric	1,000	Metric	1,000						
	Tons	US\$	Tons	US\$						
Frozen tuna	64,951	19,860	55,027	17,548						
Dried cuttlefish	10,325	2,924	13	11						
Canned salmon or										
trout	12,704	11,671	4,057	3,047						
Canned tuna	12,502	11,040	9,439	8,871						
Canned crab	4,155	7,965	2,095	4,464						
Fresh mandarin orange	10,082	1,854	-	-						
Canned "" "	40,284	14,666	4,730	1,701						
Dried mushroom	980	2,229	91	326						
Tea	14,494	9,750	1,464	1,060						
Glutamin soda (Adjino-										
moto flavor)	3,798	9,580	245	553						
Wheat flour	16,031	1,517	-	-						
Total	190,306	93,056	77,161	37,581						

* * * * *

MARINE FISHING FLEET: As of December 31, 1955, a total of 385,722 powered and nonpowered vessels were engaged in the marine fisheries of Japan, according to the May 1956 Monthly Statistics Report of Japanese Fisheries.

Table 1 - Number of Powered and Nonpowered Vessels Engaged in the Japanese Fisheries by Type of Fisheries, December 31, 1955									
Type of		l Totals	Nonpo		Powered				
Fisheries	No. of	Gross	No. of	Gross	No. of	Gross	Horse-		
	Vessels		Vessels	Tonnage	Vessels	Tonnage	power		
Grand total	385,722				142, 265		2,833,689		
Tidal inland waters	3,530	3, 458. 58		2,390.59	765	1,067.99	3, 841		
Shellfish and aquatic plants	67, 175	51, 269.89	57,843	33,042.91	9,332	18, 226.98	55,069		
Fixed-net	16,228	55, 240, 42	12,191	40,005.65	4,037	15, 234, 77	47, 160		
Pole-and-line	101,498	138, 874. 88	63,048	43,880.68	38, 450	94, 994, 20	341, 912		
Long-line	23,027	64,670.25	6,151	5,103.56	16,876	59, 566.69	187, 438		
Gill-net	24,344	116, 294.09	13,464	15, 987.92	10,880	100, 306, 17	213, 661		
Purse-seine (netting vessel)	5,180	70, 408. 76		11,179.20	2,788	59, 229.56	199,060		
Auxiliary purse-seine vessel	8,225	53, 081, 60		8,409.32	5,478	44, 672, 28	146, 565		
Square-net	8,494	33, 847. 20	4,316	7,657.01	4,178	26, 190, 19	84, 939		
Smaller trawler	19,879	116,750.21	-	-	19,879	116,750.21	368, 179		
Medium trawler									
west of 130° E	810	63, 283, 84	-	-	810	63, 283, 84	164, 595		
Otter trawler	51	19, 492, 10	-		51	19, 492, 10	31,910		
Miscellaneous drag-net	27,495	61, 168. 30	19,704	34,615,39	7,791	26, 552, 91	95, 476		
Tuna and skipjack	1,825	176, 243, 47	_		1,825	176, 243, 47	397, 415		
Whaling	117	69,623.16	-	-	117	69, 623, 16	125,723		
Government vessels	469	18,763.03	87	145.91	382	18,617,12	44, 998		
Fish carriers	5,970	125, 234.65	1,093	1,647,56	4,877	123, 587.09	210,694		
Miscellaneous fishery	65, 789	73, 501, 86	52,277	40, 128, 58	13,512	33, 373, 28	113, 954		
Sport fishing vessel	5,616	3,515.40		3, 242.70	237	272,70	1, 100		

A total of 142,265 powered vessels were engaged in the marine fisheries, of which 115,640 were under 5 gross tons and only 296 were over 299 gross tons.

Table 2 - Number of Powered Vessels Engaged in the Japanese Marine Fisheries by Gross Tonnage and Type of Fisheries, December 31, 1955												
m	Gran	d Total	Under 5 Tons 5-19 Tons		20-99 Tons		100-199 Tons		Over 200 Tons			
Type of Fisheries	No. of	Gross	No. of	Gross	No. of	Gross	No. of	Gross	No. of		No. of	Gross
	Vessels		Vessels	Tonnage			Vessels	Tonnage	Vessels		Vessels	
	142, 265						6,665	327,889.32	474	70,304.19	296	250, 734. 70
Tidal inland waters	765	1,067.99		1,044.83		23.16	-			-	-	5
Shellfish & aquatic plants	9,332		9,231	15,724.09	74	502.03	26	1,303.42		-	1	697.44
Fixed-net	4,037	15, 234. 77		6,851.21	884	8, 273.42		110.14		-	-	-
Pole-and-line	38, 450	94, 994. 20		49, 108.07	2,768	30, 307.49		15, 330.01	2	248,63	-	-
Long-line	16,876	59, 566. 69		25, 764.40	2,230	23,015.38	277	10,786.91	-	-	~	-
Gill-net	10,880	100, 306.17		16,049.72	2,462	25, 758. 95	480	23,024.04	1	105.41	6	35,368.05
Purse-seine (netting vessel) .	2,788			1,946.29	1,054	14,605.28	1,035	41, 368, 05	7	1,105.51	1	204.43
Auxiliary purse-seine vessels	5,478	44, 672. 28	3,174	8,439.24	1,946	23, 459.43	358	12,773.61	-	-	-	-
Square-net	4,178	26, 190. 19	3,255	7, 167, 12	613	5,598.80	310	13, 424.27	-	-	4.5	-
Smaller trawler	19,879	116,750.21	16,039	34,821.08	2,424	23,729.08	1,416	58, 200.05	-	-	-	-
Medium trawler west of 130°E.	810	63, 283. 84	-	-	-	-	791	61,004.03	19	2, 279.81	-	-
Otter trawler	51	19, 432, 10	-			-	-	-	-	1 - 1	51	19,492.10
Miscellaneous drag-net	7,791	26, 552, 91	6,724	15, 222, 81	1,063	11, 229.91	4	100.19	- 1	-	-	-
Tuna and skipjack	1,825	176, 243, 47	70	151.79	334	4,440.78	868	58,603.53	415	62, 257.52	138	50, 789.85
Whaling	117	69, 623, 16		25.48	38	541.25	19	600,26	2	252.42	52	68, 203.75
Government vessels	382	18,617.12	157	350.38	84	1,016.48	102	4,838.41	15	2,249.39		10, 162.46
Fish carriers	4.877	123, 537, 09	2,107	5,854.78	2,233	26,922,15	501	23, 188, 04	13	1,805.50	23	65, 816, 62
Miscellaneous fishery	13,512	33, 373, 28	12,442	20,011,78	980	10, 127.14	90	3, 234, 36	-	-	-	-
Sport fishing vessel	237	272,70	237	272.70	-		-	-	-	-	-	-

* * * * *

NUMBER AND TYPE OF OPERATORS IN THE MARINE FISHERIES: The second Japanese fisheries census after the World War II was made in January 1954, and its results were made public recently, according to the June 1956 Monthly Statistics Report of Japanese Fisheries. Some aspects of the operating structure of Japanese fisheries as revealed by the census are shown in table 1.

	Table 1 - Number of Operators Engaged in the Japanese Marine Fisheries, 1953														
		Non-			Powere	d Vesse	els by (Tross T	onnage			Fixed		Beach	Shallow-
	Total	Powered Vessels	Under 1	1-3	3-5	5-10	10-20	20-30	30-100	100-200	200 Up	Large	Small Type	Seines	Seas Aqui- culture
							(N	umber)							
Grand Total		116,205	14,055							641				4, 288	83,603 33,141
Individuals		113,777	13,848						1,549	267				2,669	
Fishermen's Cooperatives	552	92	2	23	12	45	37	17	57	13	2	90	59	37	66
Fishermen's Production															
Associations	246	6	1	2	1	7	28	25	72	8 .	2	60	22	4	8
Joint operators	13,869	2,322	202	1,822	1, 182		1,130	387	778	165	31	833	1,538	1,572	285
Companies	960	2	1	1	5	22	51	51	318	180	154	69	14	6	86
Governments, schools, &															
Laboratories	105	6	1	4	3	2	15	2	36	8	9	1	1		17

The fishing industry in Japan is operated by three types of management: (1) individuals, (2) companies, and (3) joint operators including cooperatives.

Marine fisheries industry in Japan is operated by 251,747 persons in all, of which 236,015 or 93.8 percent belong to the first type (i.e. individuals), while only 15,732 or 6.2 percent to the second and third types (i.e. companies, and joint operators including cooperatives.

The ex-vessel value of the annual production by the 251,747 fisheries operators for 1953 was 134.0 billion yen (US\$372.2 million), of which 128.4 billion yen (US\$356.7 million) was through general marine fisheries; and 5.6 billion yen (US\$15.5 million) through shallow-seas aquiculture.

Table 2 - Japanese Fisheries Data, 1953						
		Percentage for Each Type of Operator				
	Totals	Indi- viduals	Coops. &		Companies	Total
	viduals Ass'ns Operators Company					
Fisheries operators	251,747	93.8	0.3	5.5	0.4	100.0
Persons engaged in fisheries	1,162,875		3.8	20.8	5.6	100.0
Powered vessels	110,974		0.9	6.6	3,4	100.0
Gross tonnage of powered vessels	775,121	51.3	1.8	11.3	34.8	100.0
	tons					
Ex-vessel value of catches	¥134 billion	50.6	3.1	19.2	26.8	100.0

With regard to the earnings by operators, 50.6 percent of the total value went to individuals and 49.4 percent (26.8 percent of this was received by companies which make up only 0.4 percent of the number of operators) to other types of operators.



Republic of Korea

FISHERY FIRM BUYS TRAWLERS IMPORTED BY UNKRA: Ten 77-ton motor fishing trawlers ordered for Korea by the United Nations Korean Reconstruction Agency have been purchased by a new Korean fishery concern which made the successful bid of 280,000,000 hwan (US\$560,000) for the vessels.



Trawlers originally purchased by UNKRA to aid the Korean fishing industry have now been purchased by a new Korean fishery firm.

Built in Hong Kong and brought to Korea by UNKRA at a cost of some US\$610,000, the trawlers were provided as part of an over-all program undertaken by the Agency to re-establish the country's war-damaged fishing industry.

After their completion the trawlers sailed under the United Nations flag--the first vessels ever to do so--from the shipyard in Hong Kong to their anchorage at Pusan. Ownership was then formally transferred to the Korean Government by the UNKRA Agent General. Now, following their purchase, the trawlers have been transferred from the Korean Office of Supply to the Korean fishery concern.

Designed and built by a shipyard of Hong Kong in accordance with plans approved by the Korean Government, the ships have an over-all length of 75 feet 7 inches, and are equipped with British-manufactured 2-cycle, 180-horsepower marine Diesel engines.

They carry a crew of 12 to 15 and were designed to be especially suitable for fishing in Far Eastern waters.



Liberia

IMPORT DUTIES ON FISHERY PRODUCTS LOWERED: Liberia has lowered its import duties on certain fishery products, reports the United States Embassy at Monrovia. The fishery tariff items affected, the new specific rates, and the old duties (shown in parentheses) were:

Smoked or dried fish packed in airtight containers, 4 cents a pound (6 cents).

Fish or fish products packed in airtight containers, 4 cents a pound (6 cents).



Luxembourg

<u>CANNED SARDINE MARKET</u>: Imports are the only source of canned sardines in Luxembourg, states a July 20 dispatch from the United States Embassy at Luxembourg.

Imports of canned sardines into Luxembourg are recorded in a single account together with imports into Belgium, Luxembourg's partner in the Belgian-Luxembourg Economic Union (BLEU). Luxembourg's canned sardine imports are estimated to be one-thirtieth of total BLEU imports. BLEU's imports of sardines in 1955 amounted to US\$2.7 million of which Luxembourg's share would amount to US\$90,000. Of total BLEU imports during 1955, 73 percent came from Portugal, 14.6 percent from Japan, 11.9 percent from United States, and 0.5 percent from the Netherlands. In addition, a negligible percentage of the sardines consumed in Luxembourg were supplied by the small Belgian industry. (Goods brought in from Belgium are not regarded as imports and no figures on them are available.)

Sardines sold in Luxembourg in flat cans are in three sizes: 4.4-oz.; 8.8-oz.; and 17.6-oz. Pilchards are also sold in an 8.8-oz. oval can. An estimated 80 percent of local consumption is packed in 4.4-oz. flat cans. The remaining 20 percent is divided more or less equally among the other three sizes. Seventy percent of the canned sardines consumed in Luxembourg are packed in olive oil; the remaining 30 percent in tomato sauce. Canned sardines are popular among low income groups.

Retail prices of canned sardines in the 4.4-oz. flat can range from 22-36 U.S. cents a can; 8.8-oz. can, 44 cents; 17.6-oz. can, 70-76 cents; and the 8.8-oz. oval can, 35 cents.

Imports to Luxembourg would ordinarily be through a Belgian importer with an agency responsibility for both Belgium and Luxembourg, who would in turn supply a subagent in Luxembourg. Consequently, any efforts to increase United States imports would have to be made through Belgian importers.

There are almost no direct imports of canned sardines from producing countries, principally because of the small population of the Grand Duchy which amounts to only about 309,000. Imports enter BLEU through Belgium. The Luxembourg wholesaler obtains his supplies through the Belgian importer or wholesaler and then distributes to the various retailers. In the Luxembourg food supply field, there are about 30 wholesalers of any importance and some 2,000 retailers.



Malaya

DEVELOPMENT OF SEA FISHERIES UNDER WAY: About 40 Japanese fishermen, employed by a Singapore firm, will train Malayan youths in Japanese methods of fishing, according to a report from the United States Agricultural Service dated July 23. The report states that initially 70 candidates will undergo a two-year course under the expert Japanese fishermen whom they are expected to replace eventually. In the first year the trainees will be taught the theoretical part of the fishing industry and spend the second year doing practical work at sea. The Singapore fisheries Department is believed to have approved the plan.

The plan of the Chinese firm backing the venture includes, in addition to the development of the deep-sea fisheries, a plan for a shore plant to can and salt fish for local consumption as well as for export.

Other developments include the motorization of fishing craft with outboard motors. The addition of motors has increased the catch of the motor-equipped boats by 60 percent, according to the Chief Fishery Officer of Singapore. The Singapore government has assisted the fishermen in mechanizing their craft with the help of a loan fund of US\$133,000. At the present there are 550 outboard motors as compared to 100 before establishment of the loan fund. The Fishery Department maintains a mobile unit, consisting of two mechanics, to help service and teach the fishermen how to repair their outboard motors.

Two exploratory vessels are maintained by the Singapore Government and British Government to locate and survey new fishing grounds in Southeast Asia. A 500-ton yacht is being used for a trawling survey and also as a floating laboratory in the South China sea. The other craft of 100 tons is carrying out a fishing survey in Malayan waters. New fishing grounds if and when discovered are made known to the fishermen.

* * * * *

JAPANESE FIRM STUDIES POSSIBILITIES OF PEARL CULTURE: A Japanese fisheries company was reported in the Singapore press as undertaking a study of pearl culture in Malayan waters. A representative of the Japanese firm said there were promising locations for pearl culture near Penang and Singapore and that some of the species of clams used in pearl culture in Japanese waters are also found in Malaya. It is expected that an application for a license to operate would be made soon by the Japanese firm, states a dispatch (July 30) from the United States Consul General in Singapore.



Mexico

JAPANESE-MEXICAN FISHING COMPANY PLANS HAVE NOT MATERIALIZED YET: Plans for 70 Japanese drag-net fishermen to go to Mexico initially, with a possible increase in numbers up to 3,600 in the future, were reported in Commercial Fisheries Review, August 1956, p. 66.

The Sub-Director of the Mexican Department of Fisheries has informed the United States Embassy in Mexico that for the last year or so a Mexican company has been negotiating with Japan for the purchase of five fishing boats and for the entry of a limited number of expert Japanese fishermen to instruct Mexicans in the intricacies of drag-net fishing, points out a July 10 report from the Embassy. However, the Embassy representative was reminded that Mexico's labor laws are very strict and that in no case would 3,600 Japanese fishermen be permitted to enter Mexico.

The Mexican Department of Immigration has specified the conditions for the entry into Mexico of a small number of Japanese fishermen, but the Mexican company involved in this transaction has not complied with these requirements, according to the Sub-Director. He declared that every so often the company presents a new variation in the proposal to introduce Japanese fishing boats and fishermen into Mexico but that at the moment the plan appears to be dead.

* * * * *

WEST COAST SHRIMP SEASON OFF TO GOOD START: The Mexican West Coast shrimp season opened on a note of high optimism. After a closed season that lasted three months, the first shrimp boats put out to sea in May 1956 and returned with glowing reports of the quantity and size of the catch this season. If the season holds up to present anticipations, the shrimp fishery should finish a year every bit as favorable as last year's. "One more good year and all outstanding debts will be paid off," is the thought on every shrimp operator's mind at the time of this report, points out a July 3 United States consular dispatch from Nogales.



New Caledonia

TUNA RESOURCES BEING STUDIED: A special study of tuna in the waters around New Caledonia is being made by the fishing section of the Institute Francais of Oceanic. Attention is being given to the possibilities of tuna fishing as a commercial enterprise, states the <u>Pacific Island Monthly</u> of June 1956.

The scientific fishery vessel \underline{Orsom} \underline{III} of the Institute is busily at work in New Hebrides, with two scientists aboard. The men are studying ocean currents, species of fish, and plankton.

For the next international research campaign (which was scheduled between August 10 and the end of September), the $\underline{\operatorname{Orsom}} \, \underline{\mathrm{III}}$ was allotted the area including the New Hebrides and Fiji, and extending to the $\overline{\mathrm{M}}$ arshalls.



New Zealand

CANNED SARDINE MARKET: Since there is no production of sardines in New Zealand, imports are the only source of canned sardines. New Zealand's imports of canned sardines amounted to 1.0 million pounds valued at NZŁ166,200 (US\$460,400) in 1955 as compared with 636,000 pounds valued at NZŁ107,500 (US\$298,100) in 1954. It is apparent that the consumption of canned sardines in New Zealand has increased during the last two years after a decline from the 1950 level of 2.1 million pounds. This increase may be attributed in part to the relaxation of import controls on canned salmon and other canned fish in 1954. The bulk of the canned sardines was imported from Norway and Canada (see table 1), according to the United States Embassy at Wellington (August 10, 1956).

Tab	Table 1 - New Zealand's Imports of Canned Sardines by Country of Origin, First Quarter 1956, and Years 1950, 1954, and 1955											
0	First	Quarter 19	56		1955			1954		1950		
Country of Origin	Quantity	Va	lue	Quantity		lue	Quantity	Va.		Quantity		lue
	1,000 Lbs.	NZŁ1,000	US\$1,000	1,000 Lbs.	NZL1,000	US\$1,000		NZŁ1,000			NZŁ1,000	US\$1,000
United Kingdom	9.8	1.7	4.8	37.6	6.2	17.3	30.5	4.9	13.6	128.3	21.0	58,3
South Africa	-	-	-	-	-	-	- 1	-	- 1	0.6	1/	0.1
Gibralter	-		-	0.1	1/ 35,0	0,1	-	-	-	- 1	-	-
Canada	89.5	8,5	23.5	323.8		96.9	45.4	5.0	13.9	0.1	$\frac{1}{2}$, 4	0.1
Denmark	1.1	0.1	0.3	3.5	0.5	1.5	-	-	~	14.7	2.4	6.7
Eire	-	-	-	-	-	-	-	5.	-	10.6	1.7	4.7
France	-	-	-	0.6	0.2	0.4	-	-	-	-	-	-
Germany, Western	37.9	3.9	10.7	12.9	1.3	3.7	-	- 1	-	-	-	-
Netherlands	0.7	0.1	0.3	1.3	0.3	0.7			- 1	-		
Norway	96.5	18.8	52.0	622.3	121.0	335,2	549.9	96.0	266.0	1,899.8	306.1	847.8
Portugal	-	-	-	11.0	1.3	3.7	0.4	1/	0.1	-	-	-
Sweden	-	-	-	-	-	-	9.9	1.6	4.5	0.8	0.1	0.2
China	-	-	-	-	-	-	-	-	-	1/	$\frac{1}{0}$, 3	1/0,8
Morocco, French .							-	-	-	1.5	0.3	0.8
United States	2.7	0.2	0.5	2.2	0.4	0,9	-	-	-	-	-	-
Total	238.2	33.3	92.1	1,015.3	166,2	460,4	636,1	107.5	298,1	2,056.4	331.6	918.7
1/ Less than 50,	ess than 50.											

The most popular size of imported canned sardines is the $3\frac{1}{4}$ oz. to $3\frac{3}{4}$ oz. flat, although there is quite a large demand for the $1\frac{1}{2}$ -oz. size. The 8-oz. rectangular size is also available in small quantities and this is imported from California. There is little demand for the larger sizes.

Table 2 - New Zealand's Retail Prices for Canned Sardines							
Size	Type	Price Per Can					
		NZ Shillings/Pence	U.S. Cents				
$3\frac{1}{4} - oz$	Sardine oil	9d	10.5				
$3\frac{3}{4}$ - oz	Olive, soya, or						
	sardine oil	1s.2d1s.10d.	16.0-25.5				
$1\frac{1}{2}$ -oz 8-oz. rectangular	Olive or sardine oil	8.5d9d.	10.0-10.5				
8-oz. rectangular	Natural or sardine oil	2s.10d.	39.5				

The most popular packing media are in order of preference: olive oil, natural sardine oil, and soya oil.

Table 3	Table 3 - Comparative New Zealand Import Tariffs on Canned Sardines, Canned Spiny Lobsters,								
	Herring, Oysters, Pilchard, and Salmon from Various Sources								
Item	Canadian		Most Favored Nations						
Per lb.	er lb. $1\frac{1}{2}$ d.(10.5 U.S. cents) $1\frac{1}{2}$ d.(10.5 U.S. cents) $2\frac{1}{2}$ d.(18.5 U.S. cents) 3 d.(21 U.S. cents) 1/								
1/ Plus a surtax of nine-fortieths of the duties otherwise payable,									

While there does not appear to be any marked variation in consumption by various income groups, it is probable that the middle income group consumes a relatively higher proportion of sardines. It should be noted that New Zealand is chiefly a country of western culture and relatively high living standards.

The retail market price for $3\frac{1}{4}$ -oz. canned sardines packed in sardine oil is 10.5 U.S. cents a can (see table 2).

It should be noted that all types of canned fish, including sardines, pilchards, sprats, salmon, etc. were freed from import licensing control from all sources,

including the dollar area, in 1954. Therefore, New Zealand is a market which could be developed by the United States sardine industry.

Note: Values converted to US\$ equivalents at the rate of NZŁ1 equals US\$2,77 and 6d, equal 7 U.S. cents.



Norway

FISHERIES TRENDS, JANUARY-JUNE 1956: Fisheries End Profitable Six Months: Norwegian exports of fishery products, according to early reports from Bergen, were good for the first six months of 1956. Klippfish (29, 286 metric tons) and dried fish (23, 237 tons) exports considerably exceeded those for the compar-



Norwegian fishermen loading fish for market.

able period last year. Fresh and frozen fish exports were slightly lower as was herring meal. Exports of canned fish showed an increase despite the poor brisling catch (one of the worst in decades). The price for canned brisling was US\$22 a case as compared to US\$16 last year.

Favorable Outlook for Fat Herring Catch: Large-scale fishing for fat herring is now going on in the open ocean for the first time, points out a United States Embassy dispatch from Oslo (August 10). In recent years fat herring have not been found in their earlier haunts. Modern purse-

seine vessels are being used. By the end of June, 565,000 hectoliters (52,545 metric tons) had already been caught, compared to 168,000 hectoliters (15,624 tons) at that time last year. The fishing takes place principally off NordTrøndelag.

<u>Fish Grading Rules to Be Altered</u>: Changes and additions to fish-grading laws are being prepared. The Minister of Fisheries has announced that proposals to modify the grading legislation will be made to the Storting. The announcement followed considerable press discussion of complaints in export markets of poor quality Norwegian fish, sparked by a recent Italian rejection of one consignment of salted fish. Some of the press comment admitted some of the complaints were probably justified, and stated it was high time for more rigorous checking on quality. Others, calling attention to increased competition in customary Norwegian markets, stated that buyers are becoming more insistent on superior quality.

Frozen Fish Export Monopoly Temporarily Broken: Findus has obtained a license to export 500,000 pounds of frozen fish-fillet blocks to the United States. This freezing plant is the only one not a member of Norsk Frossenfisk A/L (Frionor), a joint sales agency which has the export monopoly conferred by the Government on sales of frozen fish to all countries except Sweden. Findus has long endeavored to enter the United States market in competition with Frionor. The granting of an export license to Findus was recommended by the export committee for frozen fish, the key body, to the Ministry of Fisheries which recommended the same to the Ministry of Commerce. The permit to export was granted on a trial basis. About 100,000 pounds will be shipped each month until the quota is exhausted, all to the west coast of the United States for use in making fish sticks.

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FROZEN FISH EXPORTS: Norwegian Frozen Fish (an export selling organization for most of the Norwegian fillet-packing firms), whose products are sold in the

United States under one brand, exported a total of 22,000 metric tons of frozen fish fillets in the last 12 months, reports the Norwegian Information Service in the September 1956 News of Norway. Representing a 10-percent increase as compared with the previous 12-month period, the exports are equivalent to about 50,000 tons of raw fish, or nearly a normal Lofoten fishery catch. Besides the United States, these frozen fish products are now sold in 20 foreign countries, including Cyprus, Belgian Congo, South Africa, and Australia. New markets are being added, despite sharper competition and other difficulties.



One-pound package of Norwegian frozen fish fillets.

Another Norwegian packing firm, which has good sales to Sweden and Denmark, recently entered the United States market with a shipment of 25 tons of frozen fish fillets.

WORLD'S LONGEST SALMON LADDER: In the Rana River, North Norway, the world's longest salmon ladder is nearing completion. Main feature of the ladder is a tunnel about 500 yards long blasted out of rock. Up to now the salmon have only ascended about 5 miles up the river. The tunnel will enable them to travel many miles further upstream, and greatly increase the stock of fish in the river. Total cost of the scheme is £18,000 (US\$50,000), which the sponsors believe will be covered by the income from the increased salmon yield next year, states World Fishing of July 1956.

FISHERIES TRENDS, AUGUST 1956: The marketing outlook for Peruvian fishery products as of August 1956 was somewhat mixed. Although the British market, which is now taking approximately half of the output of Peruvian canneries, is fully booked at good prices for the forthcoming season, the United States market for Peruvian canned fish is somewhat in doubt.

The fish meal market was good in the first half of 1956, but prices are now weak and exports for the second half of 1956 probably will drop, an August 21 dispatch from the United States Embassy at Lima announces.



Republic of the Philippines

CANNED SARDINE MARKET: Imports of canned sardines in the Philippines indicate a steady increase in consumption since 1953, according to a dispatch (July 6) from the United States Embassy at Manila. There is no domestic sardine industry.

Philippine imports of anchovies, herring, and sardines (pilchards) amounted to 83.6 million pounds (valued at US\$10.4 million) as compared with 39.6 million pounds (valued at US\$5.2 million) in 1954. The United States is a leading supplier. Trade sources state that United States sardines are preferred and that consumption

	Table 1 - Philippine Imports of Canned Sardines and Similar Fish, 1953-55								
Type of Fish and		1955			1954]	953	
Country of Origin	Quantity		alue	Quantity		alue	Quantity		alue
	Metric Tons	F1,000		Metric Tons		US\$1,000			US\$1,000
Anchovies:	8,047	4,691		7,891	5,112	2,556	15,389	11,623	5,812
United States	7,678	4,495	2,248	7,877	5,103	2,552	15,389	11,623	5, 812
Other	369	196	98	14	9	4	-	-	-
Herring:	25	25	12	29	21	10	39	23	12
United States	-	-	-	1	2	1	27	15	8
Hong Kong	21	21	10	22	14	7	-	-	-
Other	4	4	2	6	5	2	12	8	4
Sardines (Pilchards):	29,912	16,107		10,072	5,345	2,673	7, 465	4, 175	2,087
United States	18, 547	10,427		1,539	985	493	2,339	1,457	728
British Africa	5,327	2,342	1,171	5,045	2,375	1,187	2,452	1,240	620
Japan	4,777	2,375	1,187	3,049	1,505	752	90	46	23
Netherlands	8	4	2	-	-	-	2, 157	1,025	512
Other	1,253	959	480	439	480	240	427	407	204
Grand Total	37,984	20,823	10,412	17, 992	10,478	5,239	22,893	15,821	7,911

declined in 1953 and 1954 only because California shippers were unable to supply the demand because of an unexplained drop in the California sardine catch.

The most popular sizes of canned sardines purchased by 90 percent of the consumers are the 1-lb. ovals (35 percent); 5-oz. tall (30 percent); and 1-lb. tall (25

Table 2 - Philippine Retail Prices for Canned Sardines								
Туре	Type Size of Can							
			U.S.Cents					
Olive oil	$3\frac{1}{2}$ -5-oz. flag	0.60	30.0					
Tomato sauce	$3\frac{1}{2} - 5 - 0z$.	0.25	12.5					
11 11	8-oz, tall & 8-oz, rectangular	0.30	15.0					
11 11	1-lb. talls	0.45	22.5					
11 11	1-lb. ovals	0.50	25.0					
Natural	1-lb. talls	0.40	20.0					

percent). Some $3\frac{1}{4}$ -5 oz. flats 8-oz. talls, and 8-oz. rectangulars are also sold.

Seventy percent of the consumers prefer sardines packed

in tomato sauce, 25 percent natural pack, and 5 percent olive-oil pack.

About 90 percent of the canned sardines are eaten by persons of the lowincome group and 10 percent by the middle income group.

The retail market price of the 1-lb, oval can of sardines packed in tomato sauce is 25 U. S. cents a can (see table 2).

Normal channels of distribution are through importers who either act as whole-salers or sell to wholesalers, who in turn sell to retailers. Sardines are "decontrolled" in the Philippine Central Bank's <u>Statistical Classification of Commodities</u> for import, meaning that dollars are freely granted for their importation.



Portugal

NUMBER OF NEW FISHING VESSELS TO OPERATE AT EACH FISHING PORT TO BE REGULATED: Because many applications have been filed for permission to construct vessels for local and offshore fishing, the Navy Ministry by Decree 40,728 of August 18, 1956, extended authority to regulate the number and type of new fishing vessels which may be operated at each fishing port. One purpose was to avoid possible overfishing, states a United States Embassy dispatch (August 23, 1956) from Lisbon.

The text of the new decree reads in translation:

"Article 1. The granting of licenses for carrying out local fishing activities with motorized vessels and offshore fishing with vessels using any system of propulsion may be regulated by Ministerial Order for vessels having a module of less than 60, upon registration filed in the names of the fishermen.

"Sole Paragraph. The provisions of this article do not apply to vessels already registered on the date of entrance into force of this decree.

"Article 2. Upon hearing the interested parties, the Ministry of the Navy may establish by ministerial order limitations, with respect to each fishing port, as to the number and type of fishing vessels, both local and offshore, which may discharge their catch at such ports."

The decree confirms reports of considerable activity in constructing small fishing vessels, chiefly motorized wooden vessels of sizes ranging up to 15 tons.



Launching of one of the new trawlers constructed in Portugal.

* * * * *

FISHERIES TRENDS, MAY 1956: Sardine Fishing: Sardine catches in Portugal during May once again were highly unfavorable. Of the 825 metric tons (valued at US\$191,000 ex-vessel) of sardines landed at the packing centers during the month, only 34 tons (valued at US\$8,000) were purchased by the canneries. The balance was absorbed for immediate consumption because of the shortage of other foodstuffs. In comparison, the sardine landings in May 1955 amounted to 5,398 tons (valued at US\$532,000). The principal sardine ports in May 1956 were V. R. Sto. Antonio, Lisbon, Matosinhos, and Setubal.

Other Fishing: Landings of fish other than sardines totaled 2,623 metric tons (valued at US\$445,000 ex-vessel) and consisted principally of anchovy and chinchard and a few tons of tuna, bonito, and mackerel, the July 1956 Conservas de Peixe reports.

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<u>CANNED FISH PACK</u>, <u>JANUARY-MARCH 1956</u>: The Portuguese canned fish pack in March 1956 was very light and consisted of principally sardinelike fish. The canned fish pack for January-March amounted to 75, 100 cases, the July 1956 <u>Conservas de Peixe</u> points out.

Canned Fish Pack, Januar	y-March, 1956	
Product	Net Weight	Canner's Value
	Metric Tons	1,000 US\$
In Olive Oil:		
Sardines	532	324
Sardinelike fish	802	811
Tuna	38	40
Other species (incl. shellfish)	21	15
In Brine:		
Sardinelike fish	8	3
Other species	28	6
Total	1,429	1,199
Note: Values converted to US\$ equivalent on basis of 28,75 escudos	equal US\$1,	

* * * * *

CANNED FISH EXPORTS, JANUARY-MAY 1956: Total Portuguese canned fish exports in May 1956 totaled only 2,932 tons (154,000 cases), valued at US\$1.7 mil-

the state of the s		
Portuguese Canned Fish Exports,	January-I	May 1956
Species	January-N	May 1956
	Metric	1,000
	Tons	US\$
Sardines in olive oil	12,150	6,352
Sardinelike fish in olive oil .	1,891	1,636
Sardines & sardinelike fish		
in brine	561	108
Tuna & tunalike in olive oil .	387	315
Tuna & tunalike in brine	96	53
Mackerel in olive oil	563	345
Other fish	214	100
Total	15,862	8,909

lion, as compared with 4,228 tons, valued at US\$2.1 million, for the same month in 1955.

For the first five months of 1956, canned fish exports amounted to 15,862 tons (834,800 cases), valued at US\$8.9 million, as compared with 22,811 tons, valued at US\$11.0 million, for the same period in 1955. Sardines in olive oil was the leading product exported.

In May 1956 France was the principal buyer of Portuguese canned fish, followed by Germany, the United Kingdom, and the United States.

For January-May 1956, the leading canned fish buyer was Germany with 2,747 tons (valued at US\$1.4 million), followed by the United Kingdom with 1,768 tons (valued at US\$0.9 million), and the United States with 1,754 tons (valued at US\$1.4 million). Exports to the United States consisted of 710 tons of sardines, 910 tons of anchovies, and 8 tons of tuna.



Spain

FISHERIES TRENDS, JULY 1956: The Spanish fishing industry was very active in July 1956 due principally to heavy catches of albacore tuna landed at Vigo. Other ports in Galicia also reported good catches of albacore. The fish canneries have been operating at a high level, packing albacore for export markets, states a United States Consular dispatch from Vigo (August 8, 1956).

Fishing: The increase in landings at Vigo in July was the result of heavy catches of albacore tuna (Germo alalunga) which is known locally as "bonito." Although the albacore season started late, results have been excellent to date and have partly compensated the canneries for the lack of sardines. The average daily landings of albacore at Vigo amounted to around 330,000 pounds during the first two weeks of July. Deliveries were lower during the latter part of the month but it was anticipated that catches of commercial importance would continue for some time. La Coruna is another important fishing port and it also received heavy catches of albacore. It is reported that fishing boats from other districts of Northern Spain have unloaded their catches of albacore at Vigo and at La Coruna because higher prices were paid. Albacore brought an ex-vessel price of around US\$0.15 a pound, but the price has been as high as US\$0.17 a pound.

<u>Fish Canning</u>: The fish canneries in the Vigo area purchased 4.9 million pounds of fish at the local fish exchange in July 1956, as compared with only 98,000 pounds for the previous month and 1.7 million pounds in July 1955. The greater part of the July 1956 purchases consisted of albacore which was very abundant.

The tin-plate situation is reported unsatisfactory for the canneries. However, in view of the abundant supply of albacore at high prices, it is expected that there will be an improvement in the tin-plate situation for the canneries. It is quite pos-

sible that the canneries are now using the last of their reserve stocks of tin plate in order to take advantage of the heavy catches of albacore.

Note: Value converted at the rate of 1 besets equals US\$0.0256.



Switzerland

<u>CANNED SARDINE MARKET</u>: Since there is no domestic production of canned sardines in Switzerland, imports are the only source of canned sardines. Sardine imports are not shown separately in Swiss import statistics but lumped together with other canned fish and, consequently, domestic consumption can be estimated only roughly.

The bulk of imports of canned fish from Portugal probably consists of sardines, while France exports to Switzerland both sardines, tuna, mackerel, and some other fish. Imports from Spain consist of sardines and tuna, but the share of tuna is larger.

By using the source of imports as a basis of calculation, it may be estimated that total imports of sardines in 1955 amounted approximately to 1,900 metric tons as compared with 1,600 tons in 1954, points out a United States Embassy dispatch (June 25, 1956) from Bern.

Sardine consumption is stable. There is no definite trend in the sense of a change in preferences for certain brands, can sizes, etc. About 80 percent of the sardines consumed in Switzerland are with bones and skin, some 12 percent are boneless sardines with skin, and the remaining 8 percent are skinless and boneless sardines.

Seventy percent of the canned sardine imports are packed in 125-gram (4.4-oz.) cans, the height of the can being 30 millimeters; 12 percent in 105-gram ($3\frac{3}{4}$ -oz.) cans, 22 millimeters high; 8 percent in 150-gram (5.3-oz.) cans, 30 millimeters high; 5 percent in 325-gram (11.5-oz.) cans, 40 millimeters high (locally called "American Club"); and 5 percent in 780-gram, (27.5-oz.) cans, 80 millimeters high and in 56-gram (2-oz.) cans, 20 millimeters high. The larger cans are normally purchased by hotels and restaurants.

All these cans are rectangular, with rounded corners. Only pilchards, mackerel, and other fish are marketed in oval cans, while salmon and tuna are often in tall round cans. Sardines are usually imported in 100-can cases. Some retailers would prefer to have sardines in 50-can cartons, which are easier to handle.

About 90 percent of all sardines consumed in Switzerland are packed in olive oil. Sardines in cottonseed or peanut oil, natural sardines, or sardines in brine, tomato, or mustard sauce are not

All income groups consume sardines. Middle and high income groups consume the more expensive, often French, brands, chiefly boneless and skinless in olive oil, salt added, while low income groups consume cheaper brands, often Portugese, with skin and bones. Sardines are consumed as snacks or hors d'-

popular in Switzerland.

Table 1 - Switzerland's Retail Prices for Canned Sardines Size of Can Price Per Can Swiss Francs U. S. Cents Grams Ounces 81.8-98.1 780 27.5 3.50 - 4.20325 11.5 1.90 - 2.2044.4-51.4 150 5.3 1,10-1,30 25.7-30.4 4.4 125 0.65 - 0.9515, 2-22, 2 105 3.7 0.85 - 1.0020.0-23.4 56 2.0 0.45 - 0.6510.5-15.2

oeuvres and eaten during hikes and mountain-climbing tours. Sardines can be found in remote village stores and competition is keen, since retailers have a liberal supply of canned fish on the shelves.

The retail market prices for sardines packed in the 4.4-oz. can range from 15-22 U.S. cents a can and from 20-23 cents for the $3\frac{3}{4}$ -oz. can (see table 1).

The price difference between boneless and skinless sardines and other sardines is illustrated in showing the retail prices for the different types packed in the popular 4.4-oz. can:

Type of Canned Sardines	Price Per Can			
V.	Swiss Francs	U. S. Cents		
With bones and skin in olive oil	0.65-0.95	15.2-22.2		
Boneless but with skin in olive oil	0.85-1.00	20.0-23.4		
Boneless and skinless in olive oil	1.10-1.30	25.7-30.4		

Sardines in $3\frac{3}{4}$ -oz. cans and those in smaller cans are usually fish of superior quality, boneless and skinless, in good olive oil, salt added. Some Portugese sardines have names of United States distributors on the can, but are imported directly from Portugal. French sardines of well known makes are more expensive but their sales, despite the general prosperity prevailing in Switzerland, are limited. Sardines packed in peanut oil are normally retailed at prices slightly lower than those in olive oil.

Imports are largely conditioned by prices. There is no customs or other discrimination against United States canned fish, but United States sardines are practically unknown on the Swiss market, while other canned fish, lobsters, etc. are known and appreciated. If American sardine exporters are able to offer their products at competing prices, there is no reason why their efforts should not be successful. At present Portugese sardines happen to be cheap, while French sardines are reported to be too expensive. As a result more orders are placed now in Portugal, but the situation may change if France, or any other country, lowers its prices.

Sardines are purchased by importers and, more rarely, by wholesalers. It is rare that cooperatives or retail chain-store organizations import themselves.

Note: Values converted to US\$ equivalents at the rate of 1 Swiss franc equals 23,364 U. S. cents.



Union of South Africa

CANNED SARDINE MARKET: The production of canned sardines (pilchard) in the Union of South Africa and South-West Africa varies slightly over the years, according to a July 27 dispatch from the United States Embassy at Cape Town. In 1955, 1.6 million actual cases of canned pilchard were produced, which is a fairly good average of their annual pack. The plants in 1955 used 383,131 short tons of raw fish to produce this pack.

The pack of canned sardines is restricted by a catch quota system imposed by the Union Government as follows:

South-West Africa - 250,000 short tons of raw pilchards

Union of South Africa - 250,000 shorttons of raw fish, including pilchards and maasbankers but excluding true mackerel.

The consumption of locally-produced canned sardines is best analyzed by the 1955 local market sales which totaled 366,033 cases of all sizes and packs. Ingeneral, the local trend shows that consumption is on the increase. This can be noted by substantial increases in the sales of canned pilchards over the past four years, possibly in view of lower prices and more active marketing on the part of sellers.

The most popular sizes of canned sardines are: 1-lb. tall which accounts for 47.3 percent of the sales; 8-oz. tall, 26.2 percent; 1-lb. ovals, 9.3 percent; 8-oz. flat, 10.1 percent; 5-oz. tall, 5.5 percent; and 14-oz. flat round, 1.6 percent. About 72.5 percent of the sardines consumed are packed in tomato sauce, and 27.5 percent in brine.

The current retail market price for 1-lb. tall cans of sardines packed in tomato sauce range from 18-21 U.S. cents and in brine from 15-18 cents (see table 1).

Table 1 - Union of South Africa Retail Prices for Canned Sardines						
Q:	Price Per Can					
Size	Tomato Pac		Brine Pack			
	In Shillings & Pence	U.S.Cents	In Shillings & Pence	U.S.Cents		
$3\frac{1}{4}$ to 5 oz. flat	7d 9d	8-11	6d.	7- 9		
8-oz. tall	9d10d.	11-12	8d9d.	9-11		
1-lb. tall	1s.3d1s.6d.	18-21	1s.1d1s.3d.	15-18		
1-lb. oval	1s.9d2s	25-28	-	-		

The limited quantities of sardines imported can be traced almost entirely to Norway and Portugal. Strict import controls and lack of hard currency allocations for nonessential foodstuffs are mainly responsible for the virtual absence of United States sardines on the local market.

Note: Values converted to US\$ equivalents at the rate of L1 equals US\$2,80.

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CONTROLLED FISH MEAL PRICE INCREASED: The Union of South Africa's fish meal industry as of April 12 has been granted an increase in the controlled sell ing price of its product on the South African market. The price was raised from L30 (US\$84) a short ton to L38 (US\$106.40). This was the first price increase authorized for fish meal since the inshore fishing industry started to produce it on the West Coast 10 years ago. As expected, this increase has passed along the line from the feeds producer to the farmer. On overseas markets today the same short ton of fish meal would earn about L54 (US\$151) a ton. Subtract shipping costs of say L7 (US\$20) and export meal still earns more than the meal which has to be sold on the local market.

Instead of retaining the full increase, the fishing industry has been told that part of it must be passed on to the Cape West Coast fishermen in the form of a higher price for fish. The industry will have to pay at least 2s, or 3s, more for raw fish so that the L8 (US\$22.40)-a-ton increase allowed on meal is really only about $L5\frac{1}{2}$ to $L6\frac{1}{2}$ (US\$15,40-18,20), points out The South African Shipping News and Fishing Industry Review of May 1956.

Note: (1) See Commercial Fisheries Review, May 1956, p. 61. (2) Values converted on basis of SAL1 equals US\$2.80.

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FISHERIES TRENDS, JULY 1956: Fishing in Union of South Africa waters, which was disappointing in June, improved considerably in July. However, not all of the catch was suitable for canning and the output of canned fish in July was less than expected.

Large quantities of fish meal and fish oil reportedly were produced by the South African fishing industry in July, states an August 7, 1956, dispatch from the United States Consulate at Cape Town.

The market for South African canned fish was strong during June and July, while demand for fish meal and fish oil was seasonally low.

Production of canned and frozen spiny lobster continued to be constant and satisfactory in view of continued excellent demand and steady prices in overseas markets.



Union of South Africa - South-West Africa

FISHING AND PROCESSING LEVY TO FINANCE PILCHARD RESEARCH: Union of South Africa and South-West Africa fishermen are taxed 2d. (2.3 U.S. cents) a metric ton and factories 4d. (4.7 U.S. cents) a ton for each ton of pilchards caught and processed, respectively, to help pay for research on this fishery. The purpose of the tax was recently explained by a member of the South-West Legislative Assembly at a large meeting of fishermen in Walvis Bay in April 1956.

It was pointed out that the vital pilchard research program is being carried out by the combined fisheries research teams of the South-West Administration and the Union of South Africa's Division of Fisheries.

The Union Government already spent US\$700,000 on this research and the South-West Administration US\$238,000. However, more intensive efforts were considered necessary and to cover the extra cost of three new research vessels and 16 additional scientists in the Union and South-West Africa another US\$431,000 would have to be spent of which the Union would contribute US\$347,000 and South-West Africa US\$84,000.

The meeting was unanimous in its decision to support the tax and agreed that the factories should subtract the fishermen's tax monthly from the payments to the fishermen and then hand the money over to the Administration, states <u>The South African Shipping News and Fishing Industry Review</u> of May 1956.



U.S.S.R.

LARGER FISHING FLEET OPERATING NEAR FAROE ISLANDS: The Soviet Russian fleet engaged in fishing operations near the Faroe Islands has usually numbered about 125 trawlers and about 10 mother vessels but recently, it is reported, the number of trawlers has been increased to about 300. The Soviet Minister for Fisheries has stated to Norwegian newspapers that further expansion of the fleet is contemplated; a part of the 50 ultramodern trawlers which the U.S.S.R. has under construction in German shipyards will be commissioned in that trade in 1958.

Local Faroese newspapers state that the Danish authorities have recently loosened their very restrictive attitude towards admitting Russian vessels and their crews to the Islands. In general, the vessels were allowed to call at the ports only for water and in medical emergencies; the crews were not permitted to go ashore, and the vessels were under constant police surveillance. Now, it is stated, the Russians generally enjoy equal rights with the vessels and crews of other nations.

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REPORT ON FISHERY RESEARCH BY NORWEGIAN SCIENTIST: Norwegian scientist Finn Devold, who is well known for his research work on herring, served recently as a member of a Norwegian fishery delegation to the Soviet Union. His observations, as reported in the July 18, 1956, <u>Fiskaren</u> (Norwegian trade periodical) upon his return indicated that Russian fishery research is extensive and suc-

cessful. Devold visited the Oceanographic Research Institute in Moscow whichfunctions as the central point for similar institutes in Vladivostok on the Pacific Ocean, Astrakan on the Caspian Sea, Suchumi on the Black Sea, Rostov on the Sea of Asov, Leningrad on the Gulf of Finland, and Murmansk on the Barents Sea. He also visited the institutes on the Black Sea, the Caspian Sea, and at Murmansk. He classed the latter as one of the world's great fish harbors.

The Murmansk institute directs cod and herring research in the Barents Sea and the Norwegian Sea. It supervises three oceanic research vessels. One vessel spends the whole year on research in the Barents Sea while the other two are occupied with herring research in the Norwegian Sea. These vessels operate in much the same manner as the Norwegian research vessels and with the same objectives. The Russians are, therefore, very much interested in cooperative work with the Norwegians.

The Murmansk institute was built in 1954 and is very modern. In some respects the research vessels are better equipped than their Norwegian counterparts. For example, they were equipped with underwater television and a bathysphere. The latter could be sunk to a depth of several hundred meters with a man inside. He could observe with his own eyes how fish acted at that depth, how trawl gear operated, etc. The vessels also had Asdic and echo-sounders but in this respect the Norwegian research vessel G. O. Sars was much better equipped.

Both the Russian and the Norwegian fishery ministers were interested in developing cooperative or coordinated research studies.

With regard to the biology of the huge herring resources, the Norwegian and the Russian experiences and knowledge were in good agreement. Of particular interest was the fact that the Russians had an indication of the strength of a year-class much earlier than the Norwegians. Because of their Barents Sea observations they could state that 1953 was a relatively good year-class while 1952, 1954, and 1955 were poor. The Norwegians have not been able to gauge the strength of a year-class until it comes in as young spawning herring at four or five years of age.

The Russians were especially interested in confining utilization of the cod and herring to the level the resources could stand. Joint control of these species is of interest to both countries but the problem is not a simple one because the economic side is important. The Russians are interested primarily in the large herring and would prefer to see the Norwegian small herring fishery curtailed. The Norwegian fishermen have a good income from this fishery and are primarily interested in having the small cod spared as much as possible. They would like to see the Russians curtail their cod fishery in the Barents Sea, especially for the younger year-classes of cod.

United Kingdom

<u>COMMERCIAL TEST FOR AUREOMYCIN-STORED FISH</u>: Great interest was shown in 14,000 pounds of aureomycin-stored fish, part of the catch of the Hull trawler <u>Loch Moidart</u>, when she arrived at that port on July 10 after a 17-day trip to the Iceland fishing grounds.

The fish was 14 days old and the verdict concerning it was just as favorable as when similarly-preserved fish from a research vessel had been shown recently alongside normally-stored fish of a similar age.

The 14-day old fish was older than the Hull average, but the purpose of the experiment was to give members of the fishing industry an indication of whether or not they could expect a reduction in the spoilage rate of older fish. Both treated and untreated fillets were available for inspection, the aureomycin-preserved fish forming part of the first big-scale commercial test, states The Fishing News (July 13), a British periodical.

Later the aureomycin-stored fish were taken by the Humber Laboratory which will send some to the Torry Research Station for further tests.

None was sold for human consumption as the British Foods and Drugs Act will not permit it yet.

In mid-June another trip of aureomycin-stored fish had been brought to Hull from the Faroese fishing grounds by the Diesel-electric research trawler $\underline{\text{Sir}} \ \underline{\text{Wil-liam}} \ \underline{\text{Hardy}}$ and the demonstration immediately followed a similar one at Grimsby for display. Visitors subjected the fish to the closest possible scrutiny and they had an opportunity of comparing that stored in aureomycin ice with that caught at a similar time but stored in ordinary ice.

The fish on view had been stored for periods varying from 16 to 27 days and one could not help notice how relatively fresh and odorless was that which had been preserved by antibotics, points out the June 22 issue of The Fishing News.

Trade reaction was favorable. Praise came not only from the Hull fishing industry but also from Fleetwood trawler owners.

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FISHING INDUSTRY SUBSIDIES AND GRANTS CHANGED: Several schemes affecting fishing subsidies and grants were laid before Parliament by the Minister of Agriculture, Fisheries and Food and the Secretary of State for Scotland and passed.

"The White Fish Subsidy (United Kingdom) Scheme, 1956" changes the rates and conditions of payment of the whitefish subsidy, and will be in effect for 12 months from August 1 this year.

For vessels between 70 and 140 feet in length, and for seine-net vessels of any size which normally make voyages of more than 7 days, the Scheme provides for a fixed payment, varying according to the size of vessel, for each day spent at sea (including the day on which the catch is sold) up to a maximum of 300 days in the year. This replaces the present two-part subsidy comprising a flat-rate payment of 2d. per stone (16.7 U.S. cents a hundred pounds) of fish landed plus a voyage subsidy with over-riding maximum based on the length of the voyage and the proceeds of the catch.

For vessels of 70 feet in length and under, the present flat-rate subsidy of 8d. a stone (66.7 U.S. cents a hundred pounds) of fish landed, 6d. (50 U.S. cents a hundred pounds) on ungutted fish, and the conditions of payment remain unchanged.

The new rates mean increased subsidies for most near- and middle-water vessels to meet higher costs of operation. The Scheme provides that only those officers and crews whose remuneration is settled on the net earnings of the vessel, and who are therefore affected by increases in operating costs, will receive a share of the increase in the subsidy. All officers and crews, however remunerated, will continue to share in subsidies up to current levels of payment.

"The White Fish Subsidy (Aggregate Amount of Grants) Order, 1956," raises from £7.5 million to £10 million (US\$21 million to US\$28 million) the aggregate

amount of subsidy that may be paid under the provisions of the "White Fish and Herring Industries Act, 1953." This Order was also approved in July.

"The White Fish Industry (Grants for Fishing Vessels and Engines) (Amendment) Scheme, 1956," and "The Herring Industry (Grants for Fishing Vessels and Engines) (Amendment) Scheme, 1956," amend the Schemes made in 1955 for the payments of grants by the White Fish Authority and the Herring Industry Board towards the cost of new fishing vessels up to 140 feet in length and of new engines for existing vessels. Approved by both Houses of Parliament in July.

The last two Schemes increase the maximum amount of grant which may be paid in respect of any one vessel. This will have the effect of making available grants equivalent to the same proportion of the price of a new vessel as when grants were first introduced at a time when building costs were lower. For white fish vessels the maximum is raised from £25,000 to £30,000 (US\$70,000 to US\$84,000); for herring vessels, from £12,000 to £15,000 (US\$33,600 to US\$42,000). The White Fish Industry Scheme also exempts line-fishing vessels from the condition limiting the number of trips which a grant-aided vessel may make to distant waters. All other conditions in the 1955 Schemes remain unchanged, and the new Schemes will not affect the payment or conditions of grant in respect of any applications already approved under the present Schemes.

The schemes were debated in the House of Commons and in his speech, the Minister pointed out that there were now 50 grant-aided near- and middle-water trawlers in use, and 18 more were due to be completed this year. Another 55 had been grant-approved and would be completed on various dates from next January, reports World Fishing of August 1956.

"The White Fish Authority (General Levy) (Amendment) Regulations Confirmatory Order, 1956," confirms regulations made by the White Fish Authority, increasing as from October 1, 1956, the levy imposed by the "White Fish Authority (General Levy) Regulations, 1952" as amended by the "Amendment Regulations of 1953," from one farthing to one halfpenny for every stone (4.2 U.S. cents a hundred pounds) of white fish landed on first-hand sale. Note: (1) Values converted to US\$ equivalents at the rate of L1 equals US\$2,80.

(2) Also see Commercial Fisheries Review, April 1956, p. 41.

FISH MEAL GROWING IN IMPORTANCE: Approximately half the tonnage of fish brought into the distant-water British ports ends up in the form of white-fish meal, an extremely valuable high-protein feed used chiefly for pigs and poultry, but also for other farm stock. In the case of Hull and Grimsby, the raw material used last year totaled about 220,000 metric tons. About 75 percent of the distantwater catch is filleted and the offal (heads, tails, bones, and a part of the meat) makes up the bulk of the raw material sent to the dockside factories for conversion into fish meal by a modern dehydration process. The remaining tonnage is made up of unsold fish. The fish and the offal are all converted into fish meal within 24 hours of landing.

Total 1955 production at Hull and Grimsby amounted to 52,000 metric tons of white-fish meal, representing about 70 percent of the whole British output, The Fishing News (May 25, 1956) pointed out in an abstract of the report issued by the British Trawlers' Federation.

The farmer pays approximately L70 (US\$196) a metric ton for fish meal and he has to use 10 percent fish meal in a standard ration mixture for pigs. It takes 4.3 tons of fish to make one ton of meal. Fish is sold to the fish-meal factories at a price well below the minimum auction price for fresh fish.

Hull and Grimsby fish meal is sold under one brand name and is guaranteed 66 percent protein, less than 4 percent oil, and less than 2 percent salt.

British fish-meal imports are declining with the increase in domestic production.

Manufacturers of white-fish meal at Hull and Grimsby reported that production and sales soared to a record level during the first six months of 1956 when over 26,022 tons were sold to British farmers, compared with 19,469 tons in the same period in 1955. This was an increase of 32.5 percent.

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LARGE ALL-WELDED TRAWLER BUILT: The largest all-welded trawler built in the United Kingdom, the Boston Seafoam, was constructed for a Britishfishing company. She was commissioned in April 1956 and her trials were completed on the Humber River.

 $\underline{\text{Boston}}$ $\underline{\text{Seafoam}}$ is probably the fastest ship of her class, states the April 13, 1956, issue of $\underline{\text{The Fishing News}}$.

The vessel was built upside down. Her deck panels were first laid and the hull built upwards to the keel. Casings and superstructure were also built in this way and the ship contains 12 prefabricated units up to deck level.



The Boston Seafoam, largest all-welded trawler in the United Kingdom.

These sections were turned over ready for welding by a 12-ton electric and 7-ton steam crane and the ship has eight main welded joints.

Principal dimensions are: registered length 139 ft. 6 in., length between perpendiculars 137 ft. 6 in., moulded breadth 28 ft., moulded depth 14 ft.

The efficient hull design was confirmed by tank tests at the National Physical Laboratory, and was built in prefabricated sections according to the requirements of Lloyd's and the Ministry of transport.

A pleasing and attractive appearance has been obtained, and the vessel has a soft-nose stem, cruiser stern, and streamlined superstructure.

The 16-man crew are berthed in one eight-berth cabin and two four-berth cabins situated aft under the quarterdeck.

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Three single cabins for the chief engineer, mate, and wireless officer have been placed in the deckhouse along with the messroom, galley, food store, oilskin locker, and officers' toilet.

A deckhouse at the aft end of the main deck has been arranged as a crew's washroom, bathroom, toilet and drying room.

Access to the steering gear compartment and coal bunker is by means of hatches in the deckhouse.

A spacious cabin has been provided for the skipper and this is adjacent to the wireless room. The latest navigational aids, including radar, direction finder, and echo-sounder have been istalled.

Two lifeboats are situated on the boat deck aft, and these are operated by davits port and starboard. Inflatable life rafts will also be provided at Fleetwood, the vessel's home port.

Insulated and wood sheathed, the large capacity fishroom has an area of 9,000 square feet.

An electric trawl winch will carry 1,200 fathoms of warp on each drum and the installation is driven by an electric motor situated in the fore end of the deckhouse.

The winch installation can be controlled from either deck or bridge.

The forecastle is arranged for net stowage, lamp and paint rooms, and other suitable stores are situated below.

Liver tanks are placed on both port and starboard sides below the main deck level forward of the fishroom, and the livers are discharged through drain valves in the ship's sides.

There is a tubular steel foremast on the main deck, and two steel bobbin derricks are attached to the casing, while the anchor is handled by electric windlass.

The Diesel propelling machinery is a direct-reversing engine capable of developing 910 b.h.p. at 260 r.p.m. Fresh-water cooling is incorporated.

Power for the trawl winch generator is provided by a fresh-water cooled Diesel engine developing 315 b.h.p. at 600 r.p.m. The excitor to the generator has an output of 26 kilowatts 220 volts d.c., and has been arranged to supply power to the ship's mains if required.

Additional generating capacity has been provided by a 30-kilowatt 220-volt d.c. generator driven from the intermediate shaft when steaming to and from the fishing grounds.

A further generator of 17-kilowatts output has been included in the auxiliary set along with a clutch-coupled air compressor and general service pump.

Other engineroom equipment includes shaft-driven bilge pump, electrically-driven Diesel oil transfer pump, centrifugal oil purifier, lubricating oil pump, oil pump for the hand hydraulic steering gear and a Diesel-driven air compressor set.

Hot water for domestic and accommodation heating is supplied by an oil-fired boiler.

The main fuel oil bunkers are carried in port and starboard tanks at the fore end of the engineroom. Lubricating oil tanks are arranged in the double bottom, as is the fresh-water tank under the fore end of the fishroom.

In the engineroom the main switchboard is arranged so that any one generator can operate at a time, and an independent lighting system with circuits to the aft accommodation, wheelhouse and engineroom, is operated from a 12-volt 250-amp. battery.

The <u>Boston Seafoam</u> has been fitted with marine radio, radar, and echometer equipment, plus an auxiliary display unit, the "Fishviewer," which enables any 5-or 10-fathoms section of the water below the ship to be examined separately on a cathode-ray tube.

A receiver with remote loudspeakers and three-way talkback arrangement is employed for broadcast entertainment and orders. Talkback facilities are provided from the engineroom and steering flat.

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RESEARCH ON HANDLING AND PRESERVING FISH: The Torry Research Station, Britain's principal facility for carrying on research on the improvement of existing ways of handling and preserving fish as a food, is located at Aberdeen, Scotland's major fishing port. This is a summary of the principal projects with which the staff is now concerned:

Bacteriological Studies in Connection with Fish Spoilage: Bacteria have been found always to be present on the skin of fish, but not all species of bacteria cause decay. The scientists are endeavoring to ascertain what kinds of bacteria are responsible for decay and how they can be controlled so that, with proper treatment, fish may be landed in edible condition even though they may have been in the iced holds of fishing vessels for a longer period than they now can be kept without deterioration. One experiment which is being tried is the addition of aureomycin and perhaps other antibiotics to water used in making ice to be carried in trawlers for icing fish, to find out whether this method will beneficially reduce the harmful skin bacteria count and thus retard deterioration.

Another facet of the study concerns inspection of fish offered for sale. At present, it is understood that inspectors must depend almost entirely upon visual inspection to determine whether landed fish are in proper condition for human consumption. Along with their studies of skin bacteria, the Torry scientists are experimenting with chemically-impregnated paper which, when laid on the skin of fish, will change color in degrees related to the presence of the types of skin bacteria the paper is treated to detect. If successful, this method will provide a scientific means of determining the state of fish thus giving better protection to the consuming public and putting an end to controversy with fishermen whether particular lots of fish may be sold for human consumption or must be condemned for sale as fertilizer.

Quick-Freezing Apparatus Suitable for Installation in Trawlers: This study is related to the fact that even with modern fast trawlers, time necessary to go long distances to grounds where fish are abundant results in the earlier part of the catch being out of water so long as to have passed the peak of quality by the time it is landed. This study is concerned with the feasibility of installing quick-freezing apparatus in trawlers, designed not to handle all the catch but only that portion which would have to be kept on hand too long before landing. The Station has designed several experimental models of this kind which operate well under laboratory conditions. Since there is neither time nor the facilities at sea for gutting and filleting fish before freezing, the apparatus which has been designed would handle fish as they are caught

with a minimum of processing; they are merely poured into freezing panels and quick-frozen into slabs which are then to be stored in refrigerated compartments. Their studies have shown that unguted fish, quick-frozen to a temperature of about -20° F. and kept at that temperature will retain indefinitely all the properties of freshly-caught fish. When ready to be offered for sale, the slabs would merely be thawed and the fish treated as if they were freshly-caught. The principal problem, as might be expected and which will be next to insurmountable, is that of cost.

Fish Curing: These experiments are directed toward improving the curing process by making it more effective and at the same time more rapid and less expensive. To replace the present smoking chambers which burn wood under normal conditions and which makes the smoking process a rather lengthy one, experimental laboratory models of curing chambers have been built which utilize sawdust raised electrically to a heat which causes smoke without a blaze and which is said to be a more efficient and effective use of fuel. Coupled with this system, the scientists are experimenting with a system of polarization within the chamber which attracts the smoke directly on to the fish in cure with a view to expediting the process and to getting a heavier and more uniform layer of smoke on the fish. One problem which still proves difficult is how to obtain the proper degree of dehydration in the quick smoking process.

Venezuela

FISH CANNERS WANT MARKETING MONOPOLY: The fish canners want a fish-marketing monopoly somewhat similar to that engineered for sugar. The reason is that some canners are cutting prices and those who deplore this unorthodox marketing feel that an industry marketing monopoly would control these unfair methods. The orthodox canners (price maintainers) say that there is an actual scarcity of fish due to the fish-meal plant that converts whole fish into animal feed and that the spectacle of some canners reducing prices when the warehouses are still not filled with fish in cans is contrary to all reason. Probably the explanation of this extraordinary procedure is that some canner has old stocks, points out a July 10, 1956, report from the United States Embassy at Caracas.

Of course, the canners are not unaware of the fact that the sugar monopoly received Government-supported credit to carry its sugar supplies through to marketing. The fish canners have often urged that the Government finance their unsold pack and a fish marketing monopoly would give them an excellent chance to ask for the same treatment given the sugar monopoly.

* * * * *

MANUFACTURE OF FISH MEAL FROM WHOLE FISH PROHIBITED: The Venezuelan Ministry of Agriculture has announced in the press that the permit to convert whole herring into fish meal not be renewed. The Ministry stated the original permit was granted only on a trial basis and the conclusion has been reached to limit the production of fish meal to that made from fish scraps or waste, states a July 11 dispatch from the United States Embassy at Caracas.

Fish meal operations furnished a constant market for the fishermen and had some effect on stabilizing fish prices.

* * * * *

TERRITORIAL WATERS, CONTINENTAL SHELF, AND FISHERIES LAW: A new law governing Venezuelan territorial waters, the continental shelf, and fisheries was published in Extraordinary Number 496 of the Official Gazette on August 17,

1956. The new law proclaims a 12-mile limit for Venezuelan territorial waters, according to an August 27 dispatch from the United States Embassy at Caracas.

In general, with respect to surface waters, the law sets up the following zones:

- (1) "Territorial Sea" over which the State exercises "national sovereignty": low tide base line to 12 nautical miles (23 kilometers and 224 meters) seaward.
- (2) "Contiguous Zone" subject to "maritime vigilance and police" action of the State: three nautical miles (5 kilometers and 556 meters) wide zone adjacent to and measured from the outer limits of the "territorial sea."
- (3) Maritime Conservation zones subject to "authority and vigilance" of the State: unspecified maritime zones "outside of the territorial sea or the contiguous zone" the limits of which "shall be fixed" by the State.



Vietnam

CANNED SARDINE MARKET: Domestic production of canned sardines in Vietnam is carried on by only one small plant having a daily capacity of 8,000 360-gram cans ($12\frac{1}{3}$ -oz.), reports a July 23 United States Embassy dispatch from Saigon. The output of this plant from the beginning of operations in January 1956 to midJuly consisted of 92,000 cans of pilchards in tomato sauce, or only about 35 metric tons (net weight). The factory has recently received additional equipment for handling cans of 122 grams ($4\frac{1}{2}$ -oz.), which is the most popular size in that country.

The low volume of canned fish production is explained by the preference of the indiginous population for fresh fish, as well as for dried and, more recently, smoked fish.

Before 1956 consumption of canned sardines in Vietnman was satisfied entirely by imports. In the first half of this year domestic production contributed about 12 percent of the greatly reduced supply.

Consumption of sardines in Vietnam has been declining rapidly, and a further decline from the current level of consumption appears most likely. This development is due to the withdrawal of the French Army and of a large portion of the French civilian population, which had been the chief consumers of sardines. The

Vietnam Retail Prices for Canned Sardines							
Size	Prices in VN\$			Prices in U.S. Cents			
Size	Tomato		Vegetable Oil				
122 grams $(4\frac{1}{2}, oz.)$ flat	5.50-10.00	8.00-16.00	7.00-12.00	16-29	23-46	20-34	
360 grams (123-oz.) ovals:							
Imported	12.00-20.00	_'	-	34-57	-	-	
Domestic	10.00-14.00	-		29-40	-	-	
Note: Values converted to US\$ equivalent at the official rate of exchange applicable to imports of VN\$1 equal to US\$0,02857.							

percentage of sardines consumed by the high, middle, and low income groups is estimated at 20, 50, and 30 percent, respectively. The low income level and the food habits of the indiginous population are not conducive to the purchase of relatively high-priced canned fish products, particularly since an abundant supply of fresh and dried fish is available.

Only three sizes of cans are known in the market. About 60 percent of the consumers use the 122-gram ($4\frac{1}{2}$ -oz.) flats; 25 percent the 360-gram ($12\frac{1}{3}$ -oz.) ovals; 10 percent the 1-lb. rectangular; and 5 percent other sizes. About 60 percent of the sardines consumed are packed in tomato sauce; 15 percent in olive oil; 15 percent in vegetable oil; and 10 percent in other condiments.

Retail prices are subject to wide fluctuations, depending upon availability of supplies (see table).

During the colonial period, sardines were imported almost entirely from France and its possessions, under a system of preferential trade. In 1955 limited quantities of sardines and other canned fish were imported from the United States under the American Aid Commercial Import Program. In the fall of 1955, licensing of such imports under the American Aid Commercial Import Program was discontinued on the grounds that these products constituted luxury commodities for which foreign exchange should not be expended. Imports from the United States since then have consisted of small lots for the limited high-price market and are financed out of EFAC account currencies (foreign exchange retentions held by exporters), except for arrivals against Commercial Import Program licenses approved during calendar year 1955. For fiscal year 1956/57 no foreign exchange is being earmarked for sardines under the American Aid Commercial Import Program. Total imports of sardines in the first half of 1956 have been at approximately one-third the rate of last year's imports.

Canned sardines are imported by importers of general merchandise or directly by wholesale grocers and are distributed by them to retail stores and food peddlers.

* * * * *

JAPAN-VIETNAM COMMERCIAL FISHING AGREEMENT INAUGURATES DEEP-SEA FISHING: The first private commercial fishing agreement has been concluded recently between Vietnam and Japan through the cooperation of the Vietnamese Fishing Service, the Office of the Director General of Commerce of Vietnam, and the

United States Operations Mission. The agreement which assures the Vietnamese people of large stocks of fish at reduced prices calls for the renting of eight Japanese fishing boats with Japanese captains and crews by four Vietnamese companies. Especially important for Vietnam is the section of the contract which stipulates that a certain percent of the personnel during the fishing operations shall be Vietnamese who will be trained in the science of deep-sea fishing by the Japanese experts.

Two of the boats have already arrived and have been delivered to the Nam-Anh Fisheries Company. They are of the purse-seine type,

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modern in every respect, and weigh about 6 tons each. They are equipped with freezing units and sonar devices to detect the schools of fish. Freezers have also been installed in the participating Vietnamese firms so that the fish will remain frozen until taken to market, assuring the people a constant supply of fish without the usual danger of spoilage.

Vietnamese fishing has, in the past, been confined to canals, rivers, and close-to-shore operations as their boats were unsuited to open-sea operations. With the opening up of these new fishing grounds, which will in no way infringe on those already established, the Vietnamese will have many more kinds of fish to choose from and a greatly increased supply at reduced prices. With fresh fish within the reach of everyone, the health of the nation should be noticeably improved.

The results of several weeks of trial runs for the two boats were more than satisfactory. Experts agreed that the quality of the fish was top grade and that freshness would now be assured the consumers.

According to the Director of the Nam-Anh Fisheries Company Tran-Van-Tiet, each boat will make three trips a month. To date, each trip has brought in between 20 and 25 metric tons of fish. The immediate result was a drop in the average retail price. The six additional boats which will be delivered soon to the three other companies, should improve the situation still further.



Yugoslavia

NEW FISH CANNERIES AND MEAL PLANTS: Four new fish canneries and two fish-meal plants have been built on the Yugoslav Adriatic Coast, according to press reports from that country reprinted in Fiskets Gang (August 9, 1956), a Norwegian fishery periodical. The fish-meal plants will produce meal and oil for the domestic market, but the canneries will pack fish primarily for export.



LOBSTER--A MEAL FIT FOR A KING

Who wouldn't enjoy a meal "fit for a king?" Northernlobsters certainly fill the bill. These crustaceans are found in the cold waters off New England and Canada. They can be caught all year, but are most plentiful in the late summer months when they come in closer to the shore. This modern age of handling and transportation makes it possible for people far inland to enjoy the lobster's tender, delicately-flavored, succulent meat.

Lobsters must be alive up to the time of cooking. The live lobster's natural color is dark green. The live lobster should show movement of the legs, and the "tail" should curl under the body and not hang down when the lobster is picked up. During cooking, the color of the shell changes rapidly to "lobster red."

The four popular sizes of live lobsters, generally weighing from one to three pounds are chicken, quarter, large, and jumbo. The chicken lobster, weighing one pound, is the most economical and widely used.

The home economists of the U.S. Fish and Wildlife Service suggest that you serve your family "Lobster Newburg," a meal "fit for a king."

LOBSTER NEWBURG

POUND COOKED LOBSTER MEAT

4 CUP BUTTER OR MARGARINE
1 PINT. COFFEE CREAM
2 TABLESPOONS FLOUR
2 EGG YOLKS, BEATEN
1 TEASPOON SALT
4 TEASPOON PAPRIKA
TOAST POINTS

Cut lobster meatinto $\frac{1}{2}$ -inch pieces. Melt butter; blend in flour and seasorings. Add cream gradually and cook until thick and smooth, stirring constantly. Stir a little of the hot sauce into egg yolk; add to remaining sauce, stirring constantly. Add lobster meat; heat. Remove from heat and slowly stir in sherry. Serve immediately on toast points. Serves 6.



Federal Trade Commission

PRICE FIXING ON KING CRABS IN

ALASKA CHARGED:

A Kodiak, Alaska, affiliate of the Seafarers International Union of North America (American Federation of Labor), was found September 10, 1956 (Intial Decision, Docket No. 6368, King Crabs) by a Federal Trade Commission hearing examiner to be engaging in conspiracy and coercion to fix the prices of raw king crab.

This is not a final decision of the Commission and may be appealed, stayed, or docketed for review.



Alaska king crab (Paralithodes camtschatica)

Examiner William L. Pack held that the conspiracy may enhance the price the public ultimately must pay for king crab. He said the conspiracy includes the Union, an association of boat owners or captains, and three canners in the area.

The examiner Found that the union and the association also used coercive methods against a fourth canner, who in 1954 refused to pay the fixed price for crabs.

The relatively new king crab industry began in the Kodiak area about five years ago. It has experienced rapid growth, and now the annual wholesale value of the king crab pack is between two and three million dollars.

A king crab weighs from 8 to 20 pounds and is considered a delicacy. A case of $48\frac{1}{2}$ -pound cans of meat wholesales for about \$30.

Since 1952, the examiner said, negotiations between the union or association and the canners have resulted in a fixed price paid by canners to the vessel owners for the live crabs. In 1954 and 1955 this price was $9\frac{1}{2}$ cents a pound.

Evidence presented at hearings in Washington State and Alaska, he said, shows that the union and the association in 1955 used coercive tactics against a Port Wakefield, Alaska, cannery which refused to pay more than 8 cents a pound. The examiner found that the cannery officials were told by an association official that unless the company signed up at $9\frac{1}{2}$ cents, it would not be allowed to operate; that it would get no crabs; that if any fishing boat attempted to sell at 8 cents, it would get into trouble; that an association official would make trouble for the company with the labor union; and that the company would have trouble with its gear.

In another instance, the examiner said, a boat owner who had intended to fish for that cannery asked to be relieved of this obligation after a visit from the same association official. When attempting to hire workers for the cannery, the examiner continued, cannery officials found that union members, willing to accept jobs, were afraid lest they incur the displeasure of the union. On one occasion the cannery officials went to

union headquarters in Kodiak where a large number of cannery workers were available for work. The union's secretary, however, refused to let them work unless the cannery agreed to pay the fixed price.

The Commission's complaint in this proceeding was issued June 27, 1955.

Two of the three canners named in that complaint agreed to accept a consent order which was approved and issued by the Commission May 3. One of these two companies was of Seattle, and the other of Kodiak. The third cannery of Kodiak, did not answer the charges and is in default. Accordingly Mr. Pack on September 10 issued an order against this company.

The examiner noted in his decision involving the union that it is difficult to distinguish between the union and the association. In fact, he said, the association was formed in 1954 as the representative of boat owners or captains who had been union members prior to that time. The reason for this move was the decision of the union that the two groups, crew members and boat owners, would have to be separate. The examiner also noted that the principal officers of the association had been the principal officers of the union. In addition, the association was given a third interest in the union's assets including one-third interest in the Union Hall.

"It is difficult to escape the impression that the purported separation of boat owners and crew members was more technical than real; that actually the union is continuing to fix prices, using the association as a means to that end," the examiner said.

The examiner issued an order which specifically would prohibit the union and association from continuing any of the following activities:

(1) fixing or attempting to fix any price at which king crab or crab meat is to be purchased or sold; (2) jointly or collectively negotiating as to any such price; (3) coercing or compelling purchasers or sellers of king crab or crab meat to adhere to any price; (4) preventing or attempting to prevent any person from accepting or retaining employment in a cannery or other establishment processing king crab, with the purpose or effect of causing the establishment to maintain any particular price.

The order, however, would not be construed to prevent the following things:

(1) any respondent, individually, from negotiating with any canner or processor; (2) any association of bona fide fishermen from acting in accordance with the Fishermen's Cooperative Marketing Act; (3) collective bargaining between the union and any employer with respect to wages, hours, and working conditions of union members.



SEAWEED FOR SLIMMING

German scientists have discovered the slimming powers of seaweed. By drinking a simple concoction made from seaweed jelly, the appetite is reduced and the need for drastic dieting vanishes.

The drink, which is harmless and contains no fattening matter, forms a jelly-like lump in the stomach, which takes severalhours to digest and thus discourages eating. The drink is prepared by dissolving the jelly in water.

-- The Fishing News, September 14, 1956.

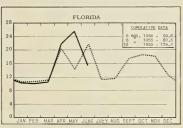


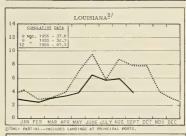
CHART I - FISHERY LANDINGS for SELECTED STATES

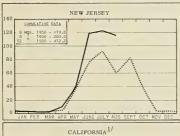
In Millions of Pounds













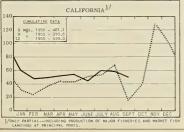
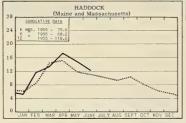
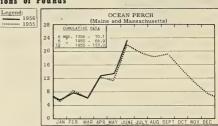




CHART 2 - LANDINGS for SELECTED FISHERIES

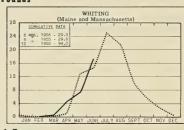




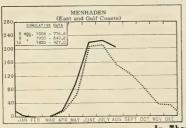


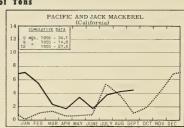
In Millions of Pounds





In Thousands of Tons





In Thousands of Tons



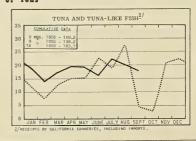
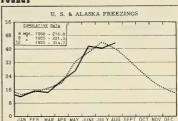


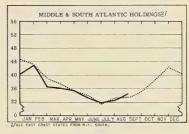
CHART 3 - COLD-STORAGE HOLDINGS and FREEZINGS of FISHERY PRODUCTS ★

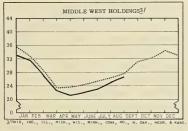


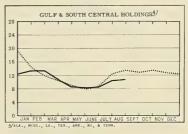


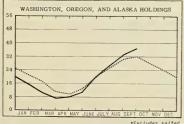


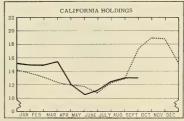








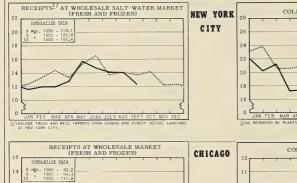


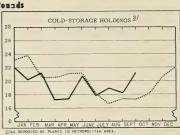


*Excludes salted, cured, and smoked products.

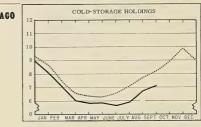
CHART 4 - RECEIPTS and COLD-STORAGE HOLDINGS of FISHERY PRODUCTS at PRINCIPAL DISTRIBUTION CENTERS

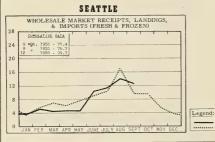
In Millions of Pounds











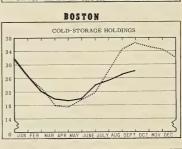


CHART 5 - FISH MEAL and OIL PRODUCTION - U.S and ALASKA



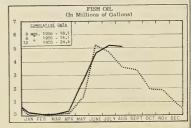
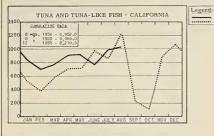
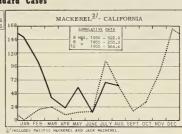


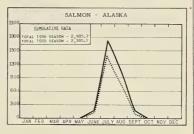
CHART 6 - CANNED PACKS of SELECTED FISHERY PRODUCTS

In Thousands of Standard Cases



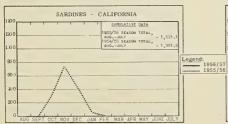






1400	SARDINES (ESTIMATED) - MAINE
	CUMULATIVE DATA
1200 8	Hgs. 1956 - 1,596.9 1955 - 802.0 " 1955 - 1,268.6
ю ло	1900 - 1,266.0
800	
600	
400	
200	
۰	
J	AN FEB MAR APR MAY JUNE JULY AUG SEPT OCT NOV DEC

STANDARD CASES							
Variety	No. Cans	Can Designation	Net V	Vgt.			
SARDINES	100	1/4 drawn	31/4	oz.			
SHRIMP	48		5	oz.			
TUNA	48	No. ½ tuna	6 & 7	oz.			
PILCHARDS	48	No. 1 oval	15	oz,			
SALMON	48	1-pound tall	16	oz.			
ANCHOVIES	48	1/2 lb.	8	oz,			



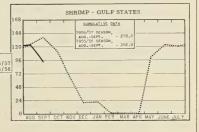
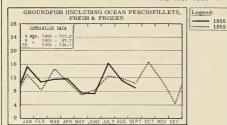
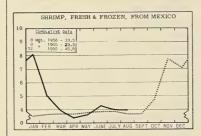


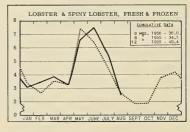
CHART 7 - U.S. FISHERY PRODUCTS IMPORTS

In Millions of Pounds

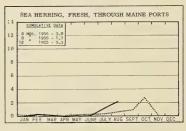


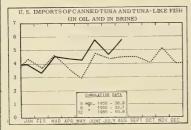


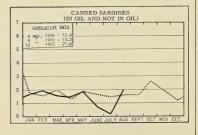


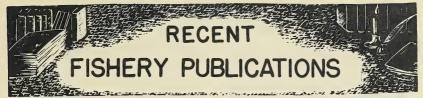












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SEP. - SEPRATES (REPRINTS) FROM COMMERCIAL FISHERIES

REVIEW.

Title

Number CFS-1340 - Massachusetts Landings (By Gear and Subarea), 1955 Annual Summary,

16 pp.

CFS-1369 - Florida Landings, April 1956, 6 pp. CFS-1382 - Fisheries of the United States and Alaska, 1954 Annual Summary, 12 pp.

CFS-1385 - Texas Landings, June 1956, 3 pp. CFS-1386 - North Carolina Landings, June 1956,

3 pp.

CFS-1387 - Georgia Landings, June 1956, 2 pp. CFS-1388 - Shrimp Landings, June 1956, 4 pp.

CFS-1391 - California Landings, April 1956, 4pp. CFS-1393 - New York Landings, June 1956, 4pp.

CFS-1394 - New Jersey Landings, June 1956, 4pp. CFS-1395 - Rhode Island Landings, June 1956, 3

CFS-1396 - Maine Landings, June 1956, 4 pp.

FL -336cc - Commercial Fisheries Outlook, July-

September (1956), 36 pp. FL - 427 - Cold Storage Design and Refrigeration Equipment (Part I - Refrigeration of Fish), by Charles Butler, Joseph W. Slavin, Max Patash-nik, and F. Bruce Samford, 146 pp., illus., processed, June 1956. Part I in a series of five leaflets on the refrigeration of fish. The first section of this leaflet is concerned with design and construction of single and multistory cold-storage warehouses, the economics governing the type of construction and design selected, and that amount of technical data required for guidance of the processor in his choice. The second section is concerned with refrigeration equipment. A resume of the equipment available and the respective advantages and disadvantages for specific tasks is given. The third section develops the refrigeration requirements as affected by the type of load; the various freezing methods presently in use are then described and evaluated. Information on particular illustrative systems of freezing and of their respective freezing rates is presented.

SL - 15 - Wholesale Dealers in Fishery Products, Georgia, 1956 (Revised), 2 pp.

SSR-Fish. No. 179 - Sonic Equipment for Tracking Individual Fish, by Parker S. Trefethen, 14 pp., illus., processed, June 1956. Special sonic devices are being developed for obtaining detailed information on individual fish behavior. A miniature underwater sonic tag is attached to an adult salmon and the movements of the fish are observed on calibrated sonic receiving equipment. The position of the fish can be pinpointed, and movements plotted for periods of time up to 100 hours. The equipment can be used in varied hydraulic conditions and infresh or salt water to track the movements of adult fish and other aquatic animals. The transducer is attached behind the dorsal fin of adult salmon by a nickel-chromium "hog-ring" clamped into the back with special pliers. It is attached un-derwater without handling or immobilizing the fish. Visual observations indicate that the transducer does not affect the natural movements of an adult salmon.

SSR-Fish. No. 181 - Underwater Telemeter for Depth and Temperature, by F. H. Stephens, Jr., and F. J. Shea, 23 pp., illus., processed, June 1956. This report describes the construction of a telemetering depth-measuring instrument to be used with midwater trawling devices in exploratory fishing and gear research. The objective in developing an instrument of this type is to enable the research fishing vessel to lower the midwater trawl to the exact depth zone where concentrations of fish occur, as determined by echo-sounding equipment.

Sep. No. 447 - Development of the Pacific Coast Ocean Shrimp Fishery.

Sep. No. 448 - New Products from Fish Oils: Part II - Polyamino Fatty Acids Derived from Fish Oils.

Sep. No. 449 - Research in Service Laboratories (September 1956): Contains these short articles-"Tentative Method for Determining Coating Con-tent of Frozen Fried Fish Sticks;" "Federal Specification for Chilled and Frozen Crab Meat;" "Prospects of Utilizing Lithium Salts of Fatty Acids from Fish Oils in Lubricating Greases."

THE FOLLOWING SERVICE PUBLICATIONS ARE AVAILABLE ONLY FROM THE SPECIFIC OFFICE MENTIONED;

California Fishery Products Monthly Summary, July 1956, 10 pp. (Market News Service, U. S. Fish and Wildlife Service, Post Office Bldg., San Pedro, Calif.) California cannery receipts of raw tuna and tunalike fish, herring, and squid; pack of canned tuna, mackerel, herring, anchovies, and squid; market fish receipts at San Pedro.

- (Chicago) June 1956 Monthly Summary of Chicago's Fresh and Frozen Fishery Products Receipts and Wholesale Prices, 10 pp. (Market News Service, U. S. Fish and Wildlife Service, 565 W. Washington St., Chicago 6, Ill.) Receipts at Chicago by species and by states and provinces; fresh-water fish, shrimp, and frozen fillet wholesale market prices; for the month indicated.
- Gulf Monthly Landings, Production, and Shipments of Fishery Products, July 1956, 5 pp. (Market News Service, U. S. Fish and Wildlife Service, 609-611 Federal Bldg., New Orleans 12, La.) Gulf States shrimp, oyster, finfish, and blue crab landings; crab meat production; LCL express shipments from New Orleans; and wholesale prices of fish and shellfish on the New Orleans French Market; for the month indicated.
- Monthly Summary of Fishery Products Production in Selected Areas of Virginia, North Carolina, and Maryland, July 1956, 4 pp. (Market News Service, U. S. Fish and Wildlife Service, 18 S. King St., Hampton, Va.) Fishery production for the Virginia areas of Hampton Roads, Lower Northern Neck, and Eastern Shore; the Maryland areas of Crisfield, Cambridge, and Ocean City; and the North Carolina areas of Atlantic, Beaufort, and Morehead City; together with cumulative and comparative data; for the month indicated.
- (New York) Monthly Summary June 1956 Receipts of Fishery Products at the New York
 City Wholesale Salt-Water Market, 4 pp. (Market News Service, 15.5 Fish and Wildlife Service, 155 John St., New York 38, N. Y.) Receipts in the salt-water section of the Fulton
 Fish Market by species and by states and provinces for the month indicated.
- Landings and Prices of Fishery Products, Boston
 Fish Pier, 1955 (Includes "Trends in the Fishing Industry at Boston"), by John J. O'Brien,
 22 pp., illus., processed, 1956. (Available
 free from the Market News Service, U. S. Fish
 and Wildlife Service, 10 Commonwealth Pier,
 Boston 10, Mass.) Fish marketing trends and
 conditions in Boston for 1955 are discussed.
 Detailed data on landings and ex-vessel prices
 of fish and shellfish at the Boston Fish Pier during 1955 are presented. Statistics are given by
 months and species and by type of gear, together with comparative data for previous years.

THE FOLLOWING SERVICE PUBLICATIONS ARE FOR SALE AND ARE AVAILABLE ONLY FROM THE SUPERINTENDENT OF DOCUMENTS, WASHINGTON 25, D. C.

Growth, Migrations, Spawning and Size Distribution of Shrimp PENAEUS SETIFERUS, by Milton J. Lindner and William W. Anderson, Fishery Bulletin 106 (From Fishery Bulletin of the Fish and Wildlife Service, vol. 56), 94 pp., illus., printed, 50 cents, 1956.

- This is a Pondfish Hatchery (Rearing and Distributing Warm-Water Fish to Help Maintain Sport Fishing), Circular 40, 2 pp., illus., printed, 5 cents, 1956.
- Wetlands of the United States (Their Extent and Their Value to Waterfowl and Other Wildlife), by Samuel P. Shaw and C. Gordon Fredine, Circular 39, 72 pp., illus., printed, \$1, 1956.

MISCELLANEOUS PUBLICATIONS

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE PROBABLY AND THE SERVICE SERVICE OF THE SERVICE SERVICE

- "Animal Sounds in the Sea," by Marie Poland Fish, Scientific American, vol. 194, no. 4, April 1956, pp. 93-95, 97-98, 100, 102, illus., printed, single copy 50 cents. Scientific American, 415 Madison Ave., New York 17, N. Y. During World War II underwater-sound men were puzzled to hear weird noises that were not made by ships. Now it is known that many marine species emit, among other sounds, chirps, whistles, grunts, and groans. The author describes in this article a study of the different sounds made by some fish and shellfish and how the sounds are made.
- "Behavior of Fishes, Especially Concurrence of Reflectorial and Psychical Reactions in Electric Fishing," by Friedrich Schiemenz, Zeitschrift F. Fischerei, No. 5/6, 1952, printed in German. (Translated from German and summarized by Dr. G. Mares, Pacific Biological Station, Nanaimo, B. C., Canada.)
- (California) Statistical Report of Fresh, Canned,
 Cured, and Manufactured Fishery ProductsYear 1955, Circular No. 30, 15 pp., printed. Marine Fisheries Branch, Department of Fish and Game, Sacramento 14, Calif., 1956. This is the 30th consecutive statistical report of fresh and processed fishery products produced in California. Through the annual publication of these figures, the State Legislature, commissioners, members of industry, sportsmen and other interested individuals and groups can obtain a picture of trends and developments. The tables are basically the same as in previous years. Two changes are included in this report. One involves a table which shows quantities of fish caught by sport anglers and processed for their use. In addition, the sole catch has been divided into its various components. The added table on processed sport fish shows only reported figures. Some of the processors did not separate the processed sport fish on their reports. In these instances the pack could not be extracted. The processing of sport fish is a growing industry. It enables the sportsman to preserve his catch for his own future use and thus eliminate waste. Landings of each species of fish, mollusk, and crustacean by the commercial fishing fleet are recorded in pounds. These landings are separated into seven general regions

and totaled Statewide. General origin of the commercial catch and the volume of shipments are recorded. Shipment figures represent fish received for canning and processing. Total case pack is listed for each variety of fish according to container size and type of pack. The pack is kept separate for the Los Angeles and San Diego districts and for Central California. The latter includes all the area from the San Luis Obispo-Santa Barbara County line to the State's northern boundary. Most of the canning reported in the Central California category, however, is from Monterey and the San Francisco Bay area. Other fishery products processed in California are recorded. The combined volume of canned and smoked sport-caught fish is listed. All the information on production used in these tables is obtained from monthly and annual reports submitted by the industry. Sardine landings and the products manufactured are recorded. Total annual case pack of anchovy, tuna, bonito, and yellowtail in various sizes of containers has been equated to the most common pack size for each variety.

- (Canada) Journal of the Fisheries Research Board of Canada, vol. 13, no. 3, May 1956, pp. 273-448, illus, printed. Fisheries Research Board of Canada, Ottawa, Canada. Contains, among others, the following articles: "Spoilage of Fish in the Vessels at Sea: 4. Effect of Removal of Gills on Rate of Spoilage," by C. H. Castell and Maxime F. Greenough; "The Behaviour of Migrating Pink and Chum Salmon Fry," by William S. Hoar; "Interspecific Competition and Population Control in Freshwater Fish," by P. A. Larkin; "On the Specific Identity of the Laval Porrocaecum (Nematoda) in Atlantic Cod," by D. M. Scott; "Climatic Trends and Fluctuations in Yield of Marine Fisheries of the Northeast Pacific," by K. S. Ketchen; and "An Investigation of the Electrical 'Spike' Potentials Produced by the Sea Lamprey (Petromyzon marinus) in the Water Surrounding the Head Region," by H. Kleerekoper and Kira Sibakin.
- (Connecticut) Report of the Shell-Fish Commissioners (July 1953-July 1955), 18 pp., printed. Connecticut Shell-Fish Commission, 185 Church St., New Haven, Conn., 1955.
- "Contribution to Study of Size, Age and Growth of the Sardine (Sardina pilchardus Walbaum) from the Eastern Coasts of Spain," by B. Andreu, Roda J. Rodriguez, and M. Gomez Larranete, Publicaciones del Instituto de Biologia Applicada, Barcelona, 7, pp. 159-189, 1950, printed in Spanish. (Translated from Spanish and summarized by Dr. G. Mares, Pacific Biological Station, Nanaimo, B. C., Canada.)
- Cooking Frozen Meats, Poultry, Game, and Fish, by Faith Fenton, Cornell Extension Bulletin 906, 15 pp., illus, printed. New York State College of Agriculture, Extension Service, Cornell University, Ithaca, N. Y., revised January 1956.
- "Difficulties Involved in Echo-Sounding Over a Sloping Bottom," by J. Scharfe, article, Fis-

- chereiwelt, vol. 4, no. 7, July 1952, pp. 99-101, printed in German. (Translated from the German by Dr. G. Mares, Pacific Biological Station, Nanaimo, B. C., Canada.)
- "Effect of Aureomycin Chlortetracycline on Fish Freshness," by M. C. Firman, A. Abbey, M. A. Darken, A. R. Kohler, and S. D. Upham, article, Food Technology, vol. 10, no. 8, August 1956, pp. 381-384, printed, single copies of periodical: domestic US\$1.50, foreign US\$1.75. The Garrard Press, 119 West Park Ave., Champaign, Ill. (Published by the Institute of Food Technologists.) The fresh quality of fish has been successfully prolonged by the antibiotic chlortetracycline applied as an ice, a dip, or a freezing brine. Antibiotic activity has been detected in the raw treated fish, and microbial counts and organoleptic observations have substantiated the effectiveness of chlortetracycline in extending the storage life of freshly-caught fish. The fish investigated include sea bass, sea trout, croaker, butterfish, haddock, scup, salmon, and halibut.
- Federal Statistical Directory, Seventeenth Edition, 162 pp., processed, 75 cents. Office of Statistical Standards, Bureau of the Budget, Washington, D. C., June 1956. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.) This directory lists the professional and technical personnel of Federal agencies (including the Fish and Wildlife Service) engaged in statistical activities, including reporting, planning, research, data collection, and analysis in economics and other social sciences.
- Fish for Hospital Catering, 24 pp., illus., printed. White Fish Authority, London, England. Provides general hints on the preparation of fish and fish cookery, written primarily for use in hospitals. Includes an article by a physician on the therapeutic value of fish, who also contributes a table of food values of white fish. Also includes items on choosing fish for normal and special diets; buying fish; the preparation and storage of fish; hygiene; cooking, serving, and garnishing fish; keeping fish hot; fish for normal diets, and for the staff; and fish for special diets.
- (FAO) Report to the Government of Pakistan on a New Fish Harbour for Karachi (Part One-Text; Part Two-Plans), by A. Van den Berg and H. van Pel, FAO Report No. 26, illus.,, processed, limited distribution. Food and Agriculture Organization of the United Nations, Rome, Italy, March 1952. This report is divided into two parts. Part I contains a summary of the findings of a survey made in 1951 by FAO experts and their recommendations for a new fish harbor at Karachi. It discusses the existing system of landing and transport of fish in the Karachi area; necessity and location of a new fish harbor; principal factors affecting the plan of a new fish harbor; plans of the new fish harbor--general arrangement and accommodation; administration and management of the new fish harbor; economic and financial aspects;

and harbor works in other fishing centers. Part II contains a map of the fishing villages in the Karachi area; drawings of aluminum fish boxes and rattan baskets; and general plans and details of a new fish harbor, fish market, icemaking and cold-storage plant, etc.

- Field and Laboratory Tests to Develop the Design of a Fish Screen Structure, Delta-Mendota Canal Headworks, Central Valley Project, California, by Dale M. Lancaster and T. J. Rhone, Hydraulic Laboratory Report No. Hyd-401, 90 pp., illus., processed. Division of Engineering Laboratories, Bureau of Reclamation, Denver, Colo., March 21, 1955.
- "Fishes of the Northern Seas of Russia," by A. P. Andriiashev, article, <u>Guides to the Fauna of the USSR</u>, vol. 53, 566 pp., printed in Russian. Zoological Institute of the Academy of Sciences of the USSR. (Excerpts translated by C. Richard Robins from Ryby Severnykh Morei SSSR. Opredeliteli po Faune SSR, Isdavaemye Zoologicheskim Institutom Akademii Nauk SSSR.)
- "Fisket ved Vest-Gronland, 1955" (Fisheries of West Greenland, 1955), by Knut Friis, article, Fiskets Gang, no. 24, June 14, 1956, pp. 342-348, illus., printed in Norwegian with brief summary in English. Fiskeridirektoren, Postgiro Nr. 691 81, Bergen, Norway. Statistics are given on the catch of cod and halibut off West Greenland during 1955. The number of vessels participating in these fisheries are also given as well as the average yield perday. The landings amounted to 14, 325 metric tons of salted cod and almost 881 tons of fresh or frozen halibut.
- "Fluctuations in Catch of the South Sakhalin Herring and Their Causes," by A. N. Svetovidov, article, Zoologicheskii Zhurnal, vol. 31, no. 6, 1952, pp. 831-842, printed in Russian. (Translated from Russian by Dr. G. Mares, Pacific Biological Station, Nanaimo, B. C., Canada.)
- "Form and Size of the 'Zone of Detection' in Echo-Sounding," by J. Scharfe, article, <u>Fischereiwelt</u>, vol. 4, no. 2, February 1952, pp. 6-8, printed in German. (Translated from German by Dr. G. Mares, Pacific Biological Station, Nanaimo, B. C., Canada.)
- "Forecasts of Catch and Overfishing of Herring," by Schubert, article <u>Die Fischwirtschaft</u>, vol. 5, no. 9, pp. 218-219, printed in German. (Translated from German and summarized by Dr. G. Mares, Pacific Biological Station, Nanaimo, B. C., Canada.)
- "Hydrobiology and Fisheries Management," by P. L. Pirozhnikov, article, <u>Zoologicheskii</u> <u>Zhurnal</u>, vol. 31, no. 1, 1952, pp. 99-109, printed in Russian. (Translated from Russian and summarized by Dr. G. Mares, Pacific Biological Station, Nanaimo, B. C.)
- (ICA) Operations Report, Data as of March 31, 1956, FY 1956, Issue No. 3, 71 pp., illus., processed.

- Office of Statistics and Reports, International Cooperation Administration, Washington 25, D. C.
- (International Law Commission) Comments by Governments on the Provisional Articles Concerning the Regime of the High Seas and the Draft Articles on the Regime of the Territorial Sea Adopted by the International Law Commission at its Seventh Session, A/CN.4/98, 49 pp., processed, United Nations-General Assembly, International Law Commission, New York, N.Y., March 12, 1956.
- (International Law Commission) Comments by Inter-Governmental Organizations on Articles Regarding Fishing Embodied in the Provisional Articles Concerning the Regime of the HighSeas Adopted by the International Law Commission at its 7th Session, A/Cn. 4/100, 4 pp., processed. United Nations--General Assembly, International Law Commission, New York, N. Y., March 13, 1956.
- (International Law Commission) Regime of the High Seas and Regime of the Territorial Sea (Report), by J. P. A. Francois, Special Rapporteur, A/CN.4/97, 32 pp., processed. United Nations-General Assembly, International Law Commission, New York, N. Y., January 27, 1956.
- (International Law Commission) Regime of the High Seas and Regime of the Territorial Sea (Addendum to the Report), by J. P. A. Francois, Special Rapporteur, A/CN. 4/97/Add. 1, 24 pp., processed. United Nations-General Assembly. International Law Commission, New York, N. Y., May 1, 1956. Summary of replies from Governments and conclusions of the Special Rapporteur.
- (International Law Commission) Regime of the High Seas and Regime of the Territorial Sea (Addendum to the Report), by J. P. A. Francois, Special Rapporteur, A/CN.4/97/Add.2, 23 pp., processed. United Nations-General Assembly, International Law Commission, New York, N.Y., May 4, 1956. Summary of replies from Governments and a continuation of the conclusions of the Special Rapporteur.
- (International Law Commission) Regime of the High Seas (The Right of International Organizations to Sail Vessels under their Flags), by J. P. A. Francois, Special Rapporteur, Supplementary Report, A/CN.4/103, 4 pp., processed. United Nations--General Assembly, International Law Commission, New York, N. Y., May 8, 1956.
- Is the Shrimp Trawl Net Destructive to Marine Life?

 (A Survey of the Literature), by Francis B.
 Taylor, 52 pp, processed. Bears Bluff Laboratories, Wadmalaw Island, S. C., June 1956.
 It has been charged that otter trawling is the cause of depletion in the supply of fish, crab, and shrimp in the waters of South Carolina. The availability or unavailability of these fish and shellfish may depend upon a variety of factors, but in the public mind, or a segment of it at any rate, the shrimp trawl fishery is held solely responsible. It is precisely because the supply

of these fish for sports fishing, at least, seems to have declined (not remained the same) in the face of expanded and intensified commercial trawling for shrimp and crab, that the complaints have become so bitter against the otter trawls' destructiveness. The purpose of this paper is to report upon a survey of the scientific literature on the subject, rather than to argue the point. A broad field of marine biological and oceanographic literature was reviewed for facts that bear upon the complaints, and appropriate data were extracted. Whatever was found to be pertinent, pro or con, is presented in this paper. Comment is offered simply to tie the parts together. The evidence presented treats only with the complaints about damage done by bottom trawling in the waters of South Carolina. It does not concern itself either with the fate of the prime reason for this trawling -- the Peneid shrimp of commerce, nor the possibility that noncommercial fishing has any bearing on the stocks of sports fishes.

- Journal du Conseil, vol. XXI, no. 2, 121 pp., illus., printed, single copy Kr. 12 (US\$1.74). Messrs. Andr. Fred. Høst & Søn, Bredgade, Copenhagen, Denmark, April 1956. Among the articles presented in this journal are the following: "The Determination and Occurrence of Nickel in Sea Water, Marine Organisms, and Sediments," by Taivo Laevastu and Thomas G. Thompson, "Time and Duration of the Spawning Season in Some Marine Teleosts in Relation to Their Distribution," by S. Z. Qasim; "Chemical Composition of the Zones in Cod Otoliths," by Eva Henly Danevig; "The 'Critical Period' in the Early Life History of Marine Fishes," by John C. Marr; and "Some Experiments on Factors Influencing Mesh Selection in Trawls," by L. K. Boerema.
- "The Lipids of Fish. 8. The Triglycerides and Cholesterol Esters of Haddock Flesh," by J. A. Lovern, article, The Biochemical Journal, vol. 63, no. 3, July 1956, pp. 373-380, illus., printed, 20 s. (US\$3, 25) net per issue. Cambridge University Press, American Branch, 32 East 57th St., New York 22, N. Y.
- "Luring Fish with Pork," article, The Crown, vol. 45, no. 8, August 1956, pp. 14, 22, illus., printed. The Crown, P. O. Box 1837, Baltimore 3, Md. A brief description of the commercial preparation of pork-rind lures for bait casting, spinning, fly rods, and salt-water fishing. Long strips of pig back, with the hide intact, are treated in brine, cut to shape, and then sent to the freezer for more treatment. After the allotted time, they are removed from the freezer and are stamped, dyed, and bottled.
- Marine Products in Japan, 30 pp., illus,, printed.
 Ministry of Agriculture and Forestry, Tokyo,
 Japan, December 1955. This beautifully illustrated pamphlet discusses the position Japan's
 marine products occupy in its economy; canning
 marine products; whale oil industry; agar-agar
 and its uses; frozen fishery products; dry-salted
 marine products; and pearl culture. Also includes a list of the hames and addresses of Japanese exporters of these products.

- "Marking Experiment of the Young Herring (Clupea pallasi) in the Pacific Coast of Hokkaido, 1949-52," by H. Kondo and H. Kitahama, article, Bulletin of Hokkaido Regional Fisheries Research Laboratory, No. 9, November 1953, printed in Japanese. (Translated from Japanese by S. Tabata, Pacific Biological Station, Nanaimo, B.C., Canada.)
- "Microbiological Assay of Vitamin B₁₂ in Marine Solids," by Paul R. Burkholder and Lillian M. Burkholder, article, <u>Science</u>, vol. 123, no. 3207, June 15, 1956, pp. 1071-1073, illus., printed, single copy 25 cents. Science, 1515 Massachusetts Ave. NW., Washington 5, D. C.
- "Microbiological Hazards of Precooked Frozen Foods," by R. P. Straka and J. L. Stokes, article, Quick Frozen Foods, February 1956, pp. 182-186, printed, single copy 50 cents. E. W. Williams Publications, Inc., 82 Wall St., New York 5, N. Y.
- Migration of the Deep Sea Scallop (PECTEN MAGEL-LANICUS), by Frederick T. Baird, Jr., Fisheries Circular No. 14, 8 pp., illus., printed. Maine Department of Sea and Shore Fisheries, Vickery-Hill Bldg., Augusta, Me., January 1954.
- "The New Fishery Act in Czechoslovakia," by J. Hanzal, article, <u>Ceskoslovensky Rybar</u>, vol. 7, no. 9, 1952, printed. (Translated from Czechoslovak and summarized by Dr. G. Mares, Pacific Biological Station, Nanaimo, B.C., Canada.)
- A New Species of Sea Perch in the Barents Sea (SEBASTES MENTELLA TRAVIN, sp. nov.), by V. I. Travin, 5 pp., processed. (Translated from Russian by C. R. Robins, 1955.)
- (Norway) Fiskeriene og Folkerettsreglene pa Havet (The Fisheries and International Law), by Olav Lund, Fiskeridirektoratets Smaskrifter Nr. 9 (Fishery Directorate Pamphlet No. 9), 19 pp., printed in Norwegian. A/S John Griegs Boktrykkeri, Bergen, Norway, 1955.
- (Norway) <u>Handsaming ay Størje</u> (Treatment of Tunafish), by Hans J. Fjørtoft, Fiskeridirektoratets Smaskrifter Nr. 5 (Fishery Directorate Pamphlet No. 5), 19 pp., illus., printed in Norwegian. A/S John Griegs Boktrykkeri, Bergen, Norway, 1955.
- (Norway) Hvor Meget Blir der Fisket opp av Lofot-Skreien? (How Much Lofot Cod is Being Caught?), by Gunnar Dannevig, Fiskeridirektoratets Smaskrifter Nr. 10 (Fishery Directorate Pamphlet No. 10), 18 pp., illus., printed in Norwegian. A/S John Griegs Boktrykkeri, Bergen, Norway, 1953.
- (Norway) <u>Hvordan Utnytter vi Vare Torskeforekom-ster?</u> (How Do We Utilize Our Cod Occurrences?), by Gunnar Saetersdal, Fiskeridirektoratets Smaskrifter Nr. 3 (Fishery Directorate Pamphlet No. 3), 10 pp., illus., printed. A/S John Griegs Boktrykkeri, Bergen, Norway, 1955.

- (Norway) Internasjonale Fiskeriavtaler som Norge er Med i (International Fishery Conventions to which Norway is a Party), Fiskeridirektoratets Smaskrifter Nr. 5 (Fishery Directorate Pamphlet No. 5), 50 pp., printed in Norwegian, A/S John Griegs Boktrykkeri, Bergen, Norway, 1953.
- (Norway) <u>Lagring av Levende Fisk i Kummer pa</u>
 <u>Land</u> (Storage of Live Fish in Basins on Land),
 by Gunnar Sundnes, Fiskeridirektoratets
 Smaskrifter Nr. 8 (Fishery Directorate Pamphlet No. 8), 6 pp., illus., printed in Norwegian. A/S John Griegs Boktrykkeri, Bergen,
 Norway, 1953.
- (Norway) Lofotfiskets Lønnsomhet 1953 (Profitability of Lofot Fishery 1953), by Kare Ruud, Fiskeridirektoratets Smaskrifter Nr. 7 (Fishery Directorate Pamphlet No. 7), 23 pp., printed in Norwegian. (Reprinted from Fiskets Gang, no. 42, 1953.) A/S John Griegs Boktrykkeri, Bergen, Norway, 1953.
- Norway) Maskeviddeforsøk med Tral i 1954 (Mesh Width Experiments with Trawl in 1954), by Gunnar Saetersdal, Fiskeridirektoratets Smaskrift er Nr. 4 (Fishery Directorate Pamphlet No. 4), 11 pp., illus., printed in Norwegian. A/S John Griegs Boktrykkeri, Bergen, Norway, 1955.
- (Norway) Merkeforsok som Viser Skreiens Oppførsel i Lofoten (Marking Experiments Showing the Behavior of the Cod in Lofoten), by Gunnar Dannevig, Fiskeridirektoratets Smaskrifter Nr. 2 (Fishery Directorate Pamphlet No. 2), 27 pp., illus., printed in Norwegian. A/S John Griegs Boktrykkeri, Bergen, Norway, 1955.
- (Norway) <u>Plan for Statens Fiskarfagskoler</u> (Prospectus for State Fishery School), Fiskeridirektoratets Smaskrifter Nr. 3 (Fishery Directorate Pamphlet No. 3), 20 pp., printed in Norwegian. A/S John Griegs Boktrykkeri, Bergen, Norway, 1953.
- (Norway) <u>Plan for Statens Fiskarfagskular</u> (Prospectus for State Fishery Schools), Fiskeridirektorates Smaskrifter Nr. 6 (Fishery Directorate Pamphlet No. 6), 20 pp., illus., printed in Norwegian. A/S John Griegs Boktrykkeri, Bergen, Norway, 1955.
- (Norway) <u>Plan for Statens Fiskarfagskoler</u> (Prospectus for State Fishery Schools), Fiskeridirektoratets Smaskrifter Nr. 8 (Fishery Directorate Pamphlet No. 8), 20 pp., illus., printed in Norwegian. A/S John Griegs Boktrykkeri, Bergen, Norway, 1955.
- (Norway) <u>Radiotelefoni pa Fiskeflaten</u> (Radiotelephone on the Fishing Fleet), Fiskeridirektoratets Smaskrifter Nr. 11 (Fishery Directorate Pamphlet No. 11), 4 pp., printed in Norwegian. A/S John Griegs Boktrykkeri, Bergen, Norway, 1953.
- (Norway) Rapport over Tokter for Sildeundersøkelser med "G. O. Sars" Vinteren 1953-54

- (Report on Expeditions on Herring Research with "G.O. Sars" in the Winter 1953-54), by Finn Devold, Fiskeridirektoratets Smaskrifter Nr. 4 (Fishery Directorate Pamphlet No. 4), 20 pp., illus., printed in Norwegian. (Reprinted from Fiskets Gang, nos. 21 and 22, 1954.) A/S John Griegs Boktrykkeri, Bergen, Norway, 1954.
- (Norway) 1. Register (Register of Canning Factories and Joint Stock Companies--Export Companies--Selling Canned Fish Products); 2. Reglement (Rules of January 22, 1932, for Marking of Canned Fish Products); 3. Generelle Kray (General Requirements for Canning Factories Desiring to be Included in the Fishery Directorate Register), Fiskeridirektoratets Smaskrifter Nr. 2 (Fishery Directorate Pamphlet No. 2), 29 pp., printed in Norwegian. A/S John Griegs Boktrykkeri, Bergen, Norway, 1953.
- (Norway) Tokter Med "G. O. Sars" i Norskehavet Vinteren 1952/53 (Expeditions with "G. O. Sars" in the Norwegian Sea-Winter 1952/53), by by Finn Devold, Fiskeridirektoratets Smaskrifter Nr. 6 (Fishery Directorate Pamphlet no. 6), 19 pp., illus., printed in Norwegian. (Reprinted from Fiskets Gang, no. 19, 1953.)

 A/S John Griegs Boktrykkeri, Bergen, Norway, 1953.
- (Norway) <u>Tralfisket etter Sild i Nordsjøen</u>(Trawling for Herring in the North Sea. Some Operating Results for the Years 1949, 1950, 1951, and 1952), by Kare Ruud, Fiskeridirektoratets Smaskrifter Nr. 4 (Fishery Directorate Pamphlet No. 4), 12 pp., printed in Norwegian. (Reprinted from <u>Fiskets Gang</u>, no. 17, 1953.) A/S John Griegs Boktrykkeri, Bergen, Norway, 1953.
- (Norway) <u>Tran i den Morke Arstiden</u> (Cod Liver Oil in the Winter), by Karl Evang, Fiskeridirektoratets Smaskriften Nr. 1 (Fishery Directorate Pamphlet No. 1), 6 pp., illus., printed in Norwegian. A/S John Griegs Boktrykkeri, Bergen, Norway, 1955.
- (Norway) Vintersildfiskets Lonnsomhet 1953 (Profitability of Winter Herring Fishery 1953), by Arthur Holm, Fiskeridirektoratets Smaskrifter Nr. 9 (Fishery Directorate Pamphlet No. 9), 33 pp., illus., printed in Norwegian. (Reprinted from Fiskets Gang, no. 43, 1953.) A/S John Griegs Boktrykkeri, Bergen, Norway, 1953.
- (Norway) Vintersildfiskets Lønnsomhet 1954 (Profitability of the Winter Herring Fishery 1954), by Kare Ruud, Fiskeridirektoratets Smaskrifter Nr. 6 (Fishery Directorate Pamphlet No. 6), 15 pp., printed in Norwegian. (Reprinted from Fiskets Gang, no. 43, 1954.) A/S John Griegs Boktrykkeri, Bergen, Norway, 1954.
- "On the Biology of Reproduction of the White Sea Wolf-Fish (<u>Anarhichas lupus</u> L.)," by V. V. Barsukov, article, <u>Zoologicheskii Zhurnal</u>, vol. 32, no. 6, 1953, pp. 1211-1216, printed

- in Russian. (Preliminary translation by W. E. Ricker, Fisheries Research Board of Canada; distributed from the Newfoundland Fisheries Research Station, St. John's, Newfoundland.)
- "Preliminary Note on the Peculiarity of Sardinella aurita of the Brazillan Coast," by W. Besnard, article, Boletin Instituto Paulista, vol.,1, no. 1, 1950, pp. 69-80, printed in Portuguese. Translated from Portuguese and summarized by Dr. G. Mares, Pacific Biological Station, Nanaimo, B. C., Canada.)
- "Populations and Migrations of the Sardine (<u>Clupea pilchardus</u> Walb) on the Portuguese Coast, "by M. Ruivo, article, <u>Boletin da Sociedade Portuguesea de Ciencias Naturais</u>, pp. 89-121, 1950, printed in Portuguese and summarized by Dr. G. Mares, Pacific Biological Station, Nanaimo, B. C., Canada.)
- "The Present Views and Limitations of Fish Traces Obtained in Echo-Sounding," by F. Schuler, article, Fischereiwelt, vol. 3, no. 7, July 1951, pp. 110-112, printed in German. (Translated from the German by Dr. G. Mares, Pacific Biological Station, Nanaimo, B. C.)
- "Productivity of Fishing Waters and Fluctuations in the Abundance of Stocks of Commercial Fishes," by E. A. Bervald, article Zoologicheskii Zhurnal, vol. 31, no. 1, 1952, pp. 82-91, printed in Russian. (Abstract translated from Russian by Dr. G. Mares, Pacific Biological Station, Nanaimo, B. C.)
- Quarterly Report on Fisheries Research, June 1956, No. 56-19, 12 pp., processed. The Marine Laboratory, University of Miami, Coral Gables, Fla.
- "Queen of the Muddy Waters," article, Georgia Game and Fish, vol. 5, no. 10, Spring Edition, pp. 8-9, 21, Illus., printed. Georgia Game and Fish Commission, 412 State Capitol, Atlanta, Ga. A brief description of the carp which can be found in nearly every state in the United States. Muddy, luke-warm streams in Georgia make ideal feeding grounds and spawning grounds for these fish.
- Rail Freight Rates and the Fish and Sea Food Industry, 37 pp., processed. Freight Rate Service Branch, Agricultural Marketing Service, U. S. Department of Agriculture, Washington, D. C., revised July 1956. A study of the current rail transportation rates on fish, shellfish, and other fishery products for purposes of analysis and comparison, and includes a comparison with rates on other food products. The rates and charges shown in this study are those prevailing on March 7, 1956.
- Rapport Annuel sur l'Evolution de la Flotte de Peche en 1955 ("Annual Report on the Development of the Fishing Fleet in 1955"), 41 pp., processed in French. Ministere des Communications, Brussels, Belgium. Presents detailed statistics on the Belgian fishing fleet.

- Rapports et Proces-Verbaux des Reunions (Reports and Verbal Proceedings of Meetings). vol. 141, 113 pp., printed in French and English, Kr. 18 (US\$2.60). Conseil Permanent International pour L'Exploration de la Mer (International Council for Exploration of the Sea), Charlottenlund Slot, Denmark, June 1956. This report is divided into two parts: Part I-Proces-Verbaux, Novembre-Octobre 1955 (Verbal Proceedings, November-October 1955); and Part II--Rapport Administratif, 1954 (Administrative Report, 1954). Part I contains a report of the forty-third meeting of the International Council for the Exploration of the Sea at Copenhagen, October 24-November 1, 1955; approved budget for the financial year, 1955-1956, resolutions passed by the 43rd Statutory Meeting, 1955; list of members of committees; experts engaged in fisheries research in the Council's area; report and recommendations of the Consultative Committee; and reports and programs of the various committees, Part II contains an administrative report for the year ending October 31, 1955; and area and other committee reports on scientific research.
- "Recorded and Visual Indications in Echo-Sounding for Fish in Proximity of the Bottom," by J. Scharfe, article, Die Fishwirtschaft, no. 3, 1953, printed in German. (Translated from German by Dr. G. Mares, Pacific Biological Station, Nanaimo, B. C., Canada.)
- "The Relationship Between Fish-Length and Scale-Length in the Pitchard (Sardina pilchardus Wal.) in the Area of Castellon, "by J. Rodriguez-Roda, M. G. Larraneta, and M. Duran, Publications del Instituto de Biologia Aplicada, Barcelona, X, pp. 53-55, 1952, printed in Spanish. (Translated from Spanish and summarized by Dr. G. Mares, Pacific Biological Station, Nanaimo, B. C., Canada.)
- Report on the Fisheries Industries of Fiji, by H. van Pel, Council Paper No. 1, 11 pp., illus, printed. South Pacific Commission, Noumea, New Caledonia. Describes a brief survey of the fishery resources of Fiji and the existing fishing methods and extent of their utilization. Past surveys and experiments are discussed; an assessment of the problems existing in the fisheries is made; and recommendations for the development of the marine and inland fisheries are given. Various ways of increasing the fish supply of Fiji, both by larger fish catches and by fish culture, have been indicated. "From the point of view of fisheries prospects," states the author, "Fiji is one of the most favoured territories in the South Pacific. There need never be a shortage of fish in this Colony."
- Report of the International Technical Conference on the Conservation of the Living Resources of the Sea (18 April to 10 May 1955, Rome), A/Conf. 10/6, United Nations Publication Sales No.: 1955. II. B. 2, 21 pp., printed, 25 cents. United Nations, New York, N. Y., 1955. (For sale by International Documents Service, Columbia University Press, 2960 Broadway, New York 27, N. Y.)

- A Review of the Cephalopods of the Gulf of Mexicoby Gilbert L. Voss, Contribution No. 155, 93 pp., illus., printed. The Marine Laboratory, University of Miami, Coral Gables, Fla. (Reprinted from Bulletin of Marine Science of the Gulf and Caribbean, vol. 6, no. 2, June 1956, pp. 85-178.) Three hundred and three specimens of cephalopods are reported upon, mostly captured by the U. S. Fish and Wildlife Service vessel Oregon in the Gulf of Mexico from 1950 to 1956. Thirty-five genera and 42 species are described and illustrated, of which 1 genus and 4 species are described as new.
- Sea Moss (CHONDRUS CRISPUS), Survey, Washington County, by Walter S. Foster, General Bulletin No. 3, 12 pp., illus., printed. Department of Sea and Shore Fisheries, Augusta, Me., 1953.
- Seaweeds at Ebb Tide, by Muriel Lewin Guberlet, 182 pp., illus., with drawings by Elizabeth L. Curtis, printed, \$3, 50. University of Washington Press, Seattle, Wash. Gives the names, habits, structures, and economic uses of the seaweeds found on the beach.
- "Solving Life Secrets of the Sailfish," by Gilbert Voss, article, The National Geographic Magazine, vol. CIX, no. 6, June 1956, pp. 859-872, illus., printed, single copy 75 cents. The National Geographic Society, Washington, D.C. A study of the life history of the sailfish. Florida sailfish spawn in late spring and early summer in shallow water along the Florida sands. At this period the females, heavy with roe, are sluggish fighters. After spawning, the eggs, scattered about in the plankton, float northward in the Gulf Stream. The number of young sailfish in the oceans would be fantastically large if all the larvae survived, for investigations show that a single female may spawn as many as 4,675,000 eggs. However, countless predators feed on eggs and young as they float helplessly in the sea. As they grow increasingly able to fend for themselves, the sailfish work inshore; juveniles five to eight inches long are found along the Carolina coast during summer. Cold weather and northerly winds head them south. Within a year they have grown to five or six feet and soon are the fighting heavyweights sought by sport fishermen. Three or four years seem to be old age for them.
- "Some New or Little Known Parasitic Nematodes of Sea Fish," by U. I. Poljanski, article, Trudy Zoologicheskow Instituta Akademia Nauk SSSR 12, pp. 133-147, 1952, printed in Russian. (Translated from Russian and summarized by Dr. G. Mares, Pacific Biological Station, Nanaimo, B. C., Canada.)
- "South African Pilchard Oil. 5. The Isolation and Structure of an Eicosapentaenoic Acid from South African Pilchard Oil, "by J. M. Whitcutt and D. A. Sutton, article, The Biochemical Journal, vol. 63, no. 3, July 1956, pp. 469-475, illus., printed, 20 s. (US\$3.25) net per issue. Cambridge University Press, American Branch, 32 East 57th St., New York 22, N.Y.

- Tarpon Cooperative Research Program, Progress Report, by Robert W. Ellis, No. 56-20, 13 pp, processed. The Marine Laboratory, University of Miami, Coral Gables, Fla., July 1956.
- "Territorial Waters and Related Matters," article, The Department of State Bulletin, vol. XXXIV, no. 869, Publication 6292, February 20, 1956, pp. 296-299, printed, single copy 20 cents. The Department of State, Washington, D. C. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D.C.) A discussion of the action taken on the subject of territorial waters and related matters by the third meeting of the Inter-American Council of Jurists at Mexico City, January 17-February 4, 1956; the situation confronting the Council of Jurists; general debate; nine-country resolution; United States declaration and reservation; and the Cuban proposal.
- Tide Tables, East Coast, North and South America (including Greenland), for the Year 1957, Serial No. 789, 277 pp., illus., printed, 50 cents. Coast and Geodetic Survey, U. S. Department of Commerce, Washington 25, D. C.
 - Tide Tables: West Coast, North and South America (including the Hawaiian Islands), for the Year 1957, Serial No. 791, 227 pp., illus., printed, 50 cents. Coast and Geodetic Survey, U. S. Department of Commerce, Washington 25, D. C.
- "Tilapia--The Brooding Father," by Lester R.
 Aronson, article, Natural History, vol. LXV,
 no. 3, March 1956, pp. 146-151, illus., printed, single copy 50 cents. American Museum
 of Natural History, Central Park West at 79th
 St., New York 24, N. Y. The name Tilapia is
 not applied to a single kind of fish but rather to
 a group of related African species which now
 number almost a hundred. This is an interesting article about the unusual spawning habits of
 the Tilapia macrocephala (also called T. heudeloti). This species of Tilapia is the predominant fish of the group along the coast of West
 Africa from Senegal south to Gabon. While it
 does not grow as large as some of the others
 and is therefore of less interest to fishery workers, it does form a staple in the diet in many
 coastal villages.
- Trust Territory of the Pacific Islands, 1955, Department of State Publication 6243, International Organization and Conference Series III, 111; 210 pp., illus., printed, 70 cents. Department of State, Washington, D. C., April 16, 1956. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D.C.) This report, covering fiscal year 1955, is the eighth annual report by the United States to the United Nations, pursuant to article 88 of the United Nations Charter, on the administration of the Trust Territory of the Pacific Islands. Some data on fisheries are included.
- "Two Weeks in Father's Mouth," by Evelyn Shaw, article, Natural History, vol. "XV, no. 3,

March 1956, pp. 152-153, illus., printed, single copy 50 cents. American Museum of Natural History, Central Park West at 79th St., New York 24, N. Y. A brief description with accompanying photographs of the changes that occur in <u>Tilapia</u> eggs during the two weeks the embryos spend in the mouth of the male.

"Under-Water Observation of Fishing Gear by Means of an Immersion (Plunge) Kettle," by Ulrich Bodo, article, <u>Fischerewelt</u>, vol. 4, no. 2, February 1952, printed in German. (Translated from German and summarized by Dr. G. Mares, Pacific Biological Station, Nanaimo, B. C., Canada.)

United States Government Organization Manual, 1956-57, 792 pp., printed, \$1. Federal Register Division, National Archives and Records Service, General Services Administration, Washington, D. C., 1956. (For sale by the Superintendent of Documents, Government Printing Office, Washington 25, D. C.)

"The Use of Echo-Sounders in Drift-Fisheries," Schuler and G. Kreft, article, <u>Fischereiwelt</u>, vol. 3, no. 4, April 1951, pp. 63-65, printed in German. (Translated from German and summarized by Dr. G. Mares, Pacific Biological Station, Nanaimo, B. C., Canada.)

"Volatile Reducing Substances (VRS) and Volatile Nitrogen Compounds in Relation to Spoilage in Canned Fish," by Lionel Farber and Michael Ferro, article, Food Technology (Published by the Institute of Food Technologists), vol. 10, no. 7, July 1956, pp. 303-304, illus., printed, single copies of periodical: domestic US\$1.50, foreign US\$1.75. The Garrard Press, 119 West Park Ave., Champaign, Ill. Describes a

study in which cans of fish were examined for their content of total volatile (TVN) and trimethylamine nitrogen (TMN) so that these could be compared with that of volatile-reducing substances (VRS). In this report are presented some representative data on the content of these substances in a number of species of fish, canned and varying in freshness or acceptability as human food, as judged organoleptically. The content of volatile-reducing substances (VRS), total volatile and trimethylamine nitrogen (TVN, TMN) in canned California anchovies, California and Atlantic herring, California mackerel, California sardines in brine and in tomato sauce and tuna was determined for material judged organoleptically to be passable and not passable. The content of VRS correlated quite closely with the organoleptic judgment, whereas the content of TVN and TMN did not show any definite correlation. The content of trimethylamine nitrogen apparently varies with the species of fish canned and is the same in fish of different states of freshness for any single species.

Whaling--Amendments to the Schedule to the International Whaling Convention Signed at Washington on December 2, 1946, Treaties and Other International Acts Series 3198, Department of State Publication 5899, 11 pp., printed, 10 cents. Department of State, Washington, D.C., 1956. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.) Presents the amendments adopted at the Sixth Meeting of the International Whaling Commission, Tokyo, Japan, July 19-23, 1954, and which entered into force November 8, 1954, and February 17 and 24, 1955.



SPECIES OF FISH FIRST USED IN THE HOT-FISH SHOPS OF THE MIDDLE WEST

In the early days of fish-frying operations, the local species such as catfish, buffalofish, perch, sunfish, and blue pike were used. One enterprising wholesale fish firm in St. Louis introduced the whiting to this trade in the 1920's and its acceptance was comparatively rapid. At the time the annual production of whiting from the Northeastern States was about 17 million pounds. Much of this was frozen near fishing centers and shipped to the St. Louis market by the carload. As late as 1932 it was considered remarkable that the ambition and industry of a few individuals could make possible the distribution of more than one-fourth of the supply of this fish in a single city, some 600 or 700 miles from the source of supply.

--<u>Sea Secrets</u>, The Marine Laboratory, University of Miami, Coral Gables, Fla.

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"HOW TO COOK HALIBUT"

<u>How to Cook Halibut</u>, the ninth in a series of cookbooks called the "Test Kitchen Series," has just come off the press and is now available to the public. This publication contains 27 recipes developed and kitchen-tested by the U. S. Fish and Wildlife Service home economists. It contains recipes for cocktails, soups, sal-



Halibut Hawaiian

ads, sandwiches, and a wide variety of main dishes along with well-illustrated pictures of four of these recipes. It also contains pertinent information about halibut which will be of general interest to the consumer.

Halibut is a firm and flavorful fish with white translucent meat. Steaks are the most common retail form in which halibut is marketed. Even though the greatest proportion of halibut comes from the Pacific Northwest, halibut is available in all parts of the United States as frozen steaks.

Fish dealers, as well as homemakers and food editors, will find many valuable uses for this recipe booklet. Many dealers can increase their halibut sales by giving this booklet to their customers. Dealers can also reprint any of these recipes, although a credit line is appreciated.

How to Cook Halibut, published by the U.S. Fish and Wildlife Service, may be obtained from the Superintendent of Documents, Government Printing Office, Washington 25, D.C., for 20 cents a copy. A 25-percent discount is given on orders of 100 or more copies sent to one address.

The other cookbooks in this series are:

Fish Cookery for One Hundred, by Rose G. Kerr. Test Kitchen Series No. 1. Price 30 cents.

Basic Fish Cookery, by Rose G. Kerr. Test Kitchen Series No. 2. Price 20 cents.

How to Cook Oysters, by Rose G. Kerr and Jean Burtis. Test Kitchen Series No. 3. Price 10 cents.

How to Cook Salmon, by Kathryn L. Osterhaug and Rose G. Kerr. Test Kitchen Series No. 4. Price 15 cents.

How to Cook Ocean Perch, by Dorothy M. Robey and Rose G. Kerr. Test Kitchen Series No. 6. Price 10 cents.

How to Cook Shrimp, by Jean Burtis and Rose G. Kerr. Test Kitchen Series No. 7. Price 15 cents.

How to Cook Clams, by Kathryn L. Osterhaug and Rose G. Kerr. Test Kitchen Series No. 8. Price 20 cents.

HALIBUT

Test Kitchen Series No. 9 Fish and Wildlife Service United States Department of the Interior

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JOHN L. FARLEY, DIRECTOR



COMMERCIAL FISHERIES REVIEW



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A review of developments and news of the fishery industries prepared in the BRANCH OF COMMERCIAL FISHERIES

A. W. Anderson, Editor

J. Pileggi, Associate Editor H. M. Bearse, Assistant Editor

Mailed free to members of the fishery and allied industries. Address correspondence and requests to the: Director, Fish and Wildlife Service, U.S. Department of the Interior, Washington 25, D.C.

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The printing of this publication has been approved by the Director of the Bureau of the Budget, August 2, 1955.

CONTENTS

COVER: Depicts the third and last (king salmon) of three stamps issued this year to emphasize the importance of fish and wildlife conservation in America. This king salmon stamp, reproduced from a drawing by Bob Hines, artist of the U, S, Fish and Wildlife Service, was released at Seattle, Wash., on November 9, 1956. This marks the first time that United States stamps have been issued to call attention to the country's important fish and wildlife resources. (See pp. 32 & 33 of this issue.)

Development of Markets for Underutilized Lake Erie F Correlation of pH and Quality of Shucked Southern Oyst	ishPreters, by	ogress Report, by Ernie D. Premetz
	Page 16 16 16 18 19 20 21 24 24 25 26 27 27 28 29 29 30 30	TRENDS AND DEVELOPMENTS (Contd.): Federal Purchases of Fishery Products: Portions Included in Fresh or Frozen Fish Federal Specification Fresh and Frozen Fishery Products Purchased by the Department of Defense, August 1956 Fish and Wildlife Motif on United States Postage Stamps. Fish and Wildlife Service: Research Helps Bring Top-Quality Fish Closer to Consumer's Table "Fish Parade" Promotion by Industry Backed by Interior Department Florida: Airboat Gill-Netting Fur-Seal Skins Great Lakes Fishery Investigations: .M/V Cisco Tries to Locate Summer Grounds of Walleye in Lake Huron (Cruise 5) . Lake Huron Investigations Continued by M/V Cisco (Cruise 6) Market for Frozen Foods Increases 50 Percent in Year North Atlantic Fisheries Exploration and Gear Research: Deep-Water Trawling For Ocean Perch by M/V De Ware (Cruise 26) North Atlantic Fisheries Investigations: Two-Year-Olds Predominate in Red Hake Popula- tion (M/V 1-78). Cruise 6) Underwater Television Equipment Tested Under Tow by Vessel T-79 (Cruise 7 and 9) North Atlantic Ferring Research: Herring Exploration Along Maine Coast and Bay of Fundy by M/V Metacomet (Cruise 6)

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DEVELOPMENT OF MARKETS FOR UNDERUTILIZED LAKE ERIE FISH--PROGRESS REPORT

By Ernie D. Premetz*

BACKGROUND

An investigation of new markets for the underutilized fish populations of Lake Erie was undertaken August 1, 1955, by the Fish and Wildlife Service's Branch of Commercial Fisheries at the specific request of the Lake Erie Fish Management Committee. Funds for the project were provided by the Saltonstall-Kennedy Act of

1954. Headquarters for this study was established near Cleveland, Ohio. Lake Erie was chosen as the site of the pilot market development program in the Midwest because of the tremendous numbers of rough fish in this Lake, particularly in the Western basin. The Service's role has been largely that of endeavoring to develop and cement contacts between producing and buying groups.

POTENTIAL ROUGH FISH PRODUCTION

A preliminary survey of the Lake Erie area indicated that there are very large populations of rough fish that play only a



Fig. 1 - Concentration of dead gizzard shad washed ashore at West Basin, Lake Erie.

secondary role in the commercial catch because of economic selectivity. These consist of gizzard shad (sawbellies), goldfish, sheepshead, carp, burbot, and white bass.

Knowledge of the potential availability of the various species of rough fish in Lake Erie is practically nil and it was difficult to determine the potential quantity that could be produced by Lake Erie fishermen. We have had to rely almost completely on the educated guesses of fishermen. Recently, the Ohio Commercial Fishermen's Association distributed questionnaries among its members asking that they indicate the quantity of each species of rough fish they felt they could produce incidental to their marketable fish during each month of the fishing season. Although all questionnaires have not as yet been returned and processed, a preliminary estimate of the potential rough fish production was obtained, using available figures (table 1). Since these are estimates from only part of the fishermen, they *Fishery Marketing Specialist, Educational and Market Development Section, Branch of Commercial Fisheries, U. S. Fish

and Wildlife Service, Sheffield Lake, Lorain, Ohio.

Note: Submitted to the Lake Erie Fish Management Committee, Buffalo, N. Y., June 6-7, 1956.

do not represent the true potential of rough fish from Lake Erie. This is particularly true for a species such as gizzard shad.

Table 1 - Potential Rough Fish Production by Members of the Ohio Commercial Fishermen's 1/Association						
Month	Sheepshead	Burbot	Carp	Gizzard Shad	Total	
	(Thousands of Pounds)					
March	130.0	11.2	310.9	185.6	637.7	
April	2,708.0	42.0	940.4	594.0	4, 284.4	
May	5,712,4	139.2	506.4	1,419.2	7,777.2	
June	4,948,2	76.0	640.3	1,724.8	7,389.3	
July	761.4	4.4	255.0	1,044.8	2,065.6	
August	285.2	4.8	305.4	450.8	1,046.2	
September	371.2	9.4	106.8	449.6	937.0	
October	277.2	15.2	184.5	507.2	984.1	
November	237.2	35.2	141.9	161.6	575.9	
December	44.5	18.0	6.4	82.8	151.7	
Total	15:475.3	355.4	3,398.0	6,620.4	25,849.1	
Actual Landings, 1955	1,575.5	89.3	2,406.9	0	4,071.7	
1/ These are estimates from only part of the fishermen. The actual potential is considerably greater.						

PROBLEMS IN UTILIZING ROUGH FISH

Let us assume that the fishermen can produce about 25 million pounds of rough fish, as indicated. Even though we had a ready market for all of these fish, there would still be a number of problems to be overcome before we could utilize these fish. Chief among these is the lack of adequate freezer space in the Lake Erie area. Last fall, J. W. Slavin, Refrigeration Engineer, and David Miyauchi, Fishery Products Technologist, from the Service's Fishery Technological Section made a survey of cold storage and freezing facilities along Lake Erie from Cleveland to Toledo, Ohio. Their report pointed up the inadequacy of freezing and cold-storage facilities throughout this area.

Another problem is the high cost of trained labor in the Lake Erie area, which would make it uneconomical for most producers to handle quantities of rough fish that are normally expected to bring a low price. If, however, rough fish could be moved with a minimum of handling, most producers would be willing to handle these fish.

Still another problem, undoubtedly the most important to the fishermen, is the relatively low price paid for rough fish by processors of food for animals. Initially, most fishermen indicated they could catch no fish for less than five cents a pound. Most fishermen now feel they can catch for about two cents a pound, and some feel they can produce for even less. If the problems of refrigeration, handling, and transport can be solved, a price agreement between fisherman and buyer could be more readily attained.

Many possible markets for Lake Erie rough fish have been explored. Among these are: human food industry, fur farm industry, pet food industry, fish meal industry, and fish hatchery foods.

FOR HUMAN CONSUMPTION

Naturally, the first market to be considered for Lake Erie rough fish would be that of human food. At the present time, a limited market is available for carp, sheepshead, and burbot for human consumption. Our investigations show, however, that it is doubtful that any increase in this area can be expected. The human food market for rough species has declined in the pastfew years. This past year the

prices for rough species have been particularly low. Lake Erie fishermen are finding it uneconomical to transport species such as carp to Chicago to compete with the fish produced locally and more cheaply. Some rough fish are being sold live in Southern markets for stocking purposes, but it is doubtful that this business will grow sufficiently to be of any appreciable benefit to Lake Erie fishermen.

Gizzard shad, capable of production in tremendous quantities, have never been used as human food, and it is doubtful that they ever will be.

FOR ANIMAL FEEDING

One of the best potential markets for Lake Erie rough fish is the fur farm industry. There are some 5,000 mink ranches in the United States and the National Board of Fur Farm Organizations estimates that these ranchers can use some 250 million pounds of fish a year. Over two thirds of these fur farms are within easy reach of Lake Erie fishermen.

The fur farmers are interested in purchasing greater quantities of fish, since prices for horse meat, the hitherto standard protein ration, are constantly rising. About four years ago, the price of horse meat was about $7\frac{1}{2}$ cents a pound as compared to about 12 cents a pound today. On the Pacific Coast, many ranchers are feeding as high as 90 percent fish at the present time, with success. Many Mid-

western ranchers feed as high as 50 percent fish and it is anticipated that they will soon be feeding as high as 65 percent fish. A few years ago it was a rarity to see more than 15- to 20-percent fish in mink diets in the Midwest.

The mink industry is a growing industry. Reportedly, some 70 percent of all furs used in the United States are mink. Pelt production has risen about 15 percent yearly for the past several years. The average pelt price has increased 10 to 20 percent in recent years.

Since the mink industry seemed the greatest potential market for rough fish, our initial market development activities have been directed, for the most part, to this market.

FISH FOR PET FOOD PACKERS

Use of fish in the pet food industry has increased tremendously during the past decade. In 1947, this industry



Fig. 2-Removing and hauling away gizzard shad dead from natural causes at West Basin, Lake Erie. Gives some idea of the potential fishery for this species if some use was found for it,

packed about 43.7 million pounds of fish-based pet foods, valued at almost \$4 million to the packer. In 1955 the pack of fish-based pet food totaled 256 million pounds, valued at \$27.5 million. Part of this increase has been due to an expansion of the pet food industry, whereas, part has been due to the shortage of horse meat, with fish now being used as an effective substitute, especially in food for cats. Indications are that this industry will continue to expand during the next decade. Several pet food manufacturers have already started on long-range expansion of plantfacilities in fish-producing centers.

Shortage of products normally used in processed dog food, such as horse meat, is forcing these canners to look for a substitute. Fish may well be the logical re-

placement. The Department of Agriculture reports that about 50 percent of all processed dog foods are certified, which requires that the products be fit for human consumption, be nutritious, and contain no inedible materials. Recent conferences between the Departments of Agriculture and Interior and pet food manufacturers have encouraged a compromise and clarification in the interpretation of present dog food ingredients. If this compromise can be reached, the dog food industry could within the existing inspection service use considerably more fish in the future, thus creating an additional market for rough species.

FOR FISH MEAL

The fish meal industry was initially considered another excellent market for rough fish. Investigation showed, however, that a fish meal and oil operation was not economical in the Great Lakes area at the present time due to seasonal factors and the fact that production is dispersed over a wide area. The present price paid for this type of fish meal (about \$140 a ton) precludes payment of more than about one cent a pound for the raw fish. Lake fish are low in oil content, and an operation in this area would be strictly for fish meal.

Plans and specifications for a fish reduction plant, mounted on a trailer bed and capable of being moved from place to place, have been designed for the Service by Renneberg and Sons, of Baltimore, Md. Although this unit was limited as to hourly capacity for a large-scale commercial operation, it was anticipated that it would serve some use in connection with state rough fish removal programs. Many states now find it necessary to pay considerable money to catch these fish and to haul them away for disposal. Possibly the fish could be made into fish meal and the money derived from its sale would defray removal costs. Several Midwestern States have developed their own rough fish marketing programs, and most of the rough fish is being either sold for human or animal food uses. A good example is that of the State of Wisconsin. Commercial fishing took about 3.6 million pounds of rough fish (sheepshead) out of Lake Winnebago last year. All of it found a ready market, primarily as mink feed. Wisconsin Conservation officials hope to more than double the take from Winnebago in 1956.

Other states are not so readily finding such markets and may well investigate the application of the portable reduction plant to their programs.

OTHER USES

Other possible markets for rough fish are Federal and state fish hatcheries and rearing stations, and the many trout and pondfish dealers throughout the United States. Although these outlets represent a potential market for millions of pounds of fish annually, many problems still require solutions before any substantial program can be assured. Further investigation of this market will be deferred until a later date.

WORK ON SUITABILITY OF ROUGH FISH FOR ANIMAL FOOD

Considerable work has already been done by the Fish and Wildlife Service's Technological Section, the University of Wisconsin, individual mink ranchers, and pet food manufacturers on the suitability of Lake Erie rough fish as animal food.

The Service has been working on the proximate composition of sheepsheadfrom Lake Erie as early as 1951. Since that time a regular sampling of the principal species has been made to determine if seasonal and area differences occur in the principal constituents. Analyses were made of the edible portion and the trimmings. More recently, whole raw rough fish from Lake Erie were analyzed to determine the proximate composition and the thiaminase content (table 2).

Lake Erie rough fish run considerably higher in fat content than the marine fish, which many mink ranchers consider an asset. Thiaminase, an enzyme capable of thiamine destruction, is an important consideration particularly in fish to be used for feeding mink. If a small proportion of fish containing an appreciable amount of this enzyme is mixed with another lot of fish not containing the enzyme, the vitamin thiamine present in the mixed lot may be destroyed. Thiamine in the

Table 2 - Proximate Composition and Thiaminase Assay of						
Fresh-Water Rough Fish From Lake Erie						
Species	Date Caught	Dry Matter	Protein	Fat	Ash	Thiaminase
Sheepshead $\frac{1}{2}$	Oct. 1951	24.2	18.4	6.0	1.1	4/
2/	June 1952	24.6	17.2	6.9	1.1	4/
$\overline{1}/\ldots\langle$	Aug. 1954	24.5	17.5	6.0	1.0	$\frac{\frac{4}{4}}{\frac{4}{4}}$
$\overline{3}/\ldots$	Sept. 1955	28.3	16.3	8.0	4.2	4/
$\frac{\frac{1}{3}}{\frac{3}{2}}$	Nov. 1955	28.3	16.3	8.0	4.2	None
Gizzard Shad ³ /	Nov. 1955	37.0	16.2	17.6	3.0	Present
Burbot $\frac{3}{2}$	Nov. 1955	22.8	13.9	5.2	2.4	Present
$Carp^{3}$	Nov. 1955	32.7	16.5	10.6	5.0	Present
Goldfish $\frac{3}{2}$	Sept. 1955	32.7	16.5	10.6	5.0	4/
<u>3</u> /	Nov. 1955	32.7	16.5	10.6	5.0	Present
1/ Edible portion and trimmings. 3/ Whole raw fish, 2/ Edible portion only, 4/ Not analyzed for thiaminase.						
Note: Analyses made by Service Technological Laboratory, College Park, Md.						

diet is necessary to the proper growth and development of mink. Lack of thiamine causes chastic paralysis in mink. Thiaminase may also destroy the thiamine in other constituents in the diet. Cooking the fish prior to feeding the animals will destroy this enzyme. Raw fish containing thiaminase may be fed to mink if special precautions are taken to feed the raw fish apart from the other diet ingredients. Some mink ranchers feed raw fish known to have a high thiaminase content, such as carp, on alternate days, with no detrimental effect.

The Service plans considerable work on fresh-water fishes this year. Samples of rough fish will be collected throughout the year to ascertain seasonal and area variation in the proximate composition of these fish. The results are being made available to the animal food industries and fur farmers to facilitate the development of a properly balanced nutritive diet.

Fur animal nutritional research has been conducted by Dr. Leoschke of the University of Wisconsin. Experiments recently completed showed that sheepshead was an excellent feed for mink. It was thiaminase-free and could be fed in either the raw or cooked state. Dr. Leoschke is at present interested in doing similar nutritional research, using gizzard shad. He believes this species shows a great deal of promise as mink feed.

Individual mink ranchers also have conducted fish-feeding experiments. Most of this work is being done by the larger mink ranchers. Many lake species have been tried. Extensive use of sheepshead on mink ranches in the Midwest resulted from just such experiments. Last year some of the mink ranchers fed sheepshead, exclusively, with promising results. Some ranchers are now planning to try burbot and gizzard shad along with cooked smelt and carp. Some ranchers have suffered losses because of lack of good basic information on various species of fish. Most favor nutritional research by some central agency where controlled experiments can demonstrate that most suitable application of fish to mink diets.

Pet food concerns have tested practically every species of "trash" fish on both coasts and in the Gulf area and are now testing fresh-water rough fish. Some of

the larger concerns have this analytical work done by their own staffs, while other have commercial testing laboratories run the tests for them. Smelt is already being used by some of the cat food canners in the Midwest. Other species, such as carp, burbot, and gizzard shad will be tested in the near future.

PROBLEMS IN DEVELOPING ROUGH FISH MARKETS

Initial progress in developing markets for Lake Erie rough fish has been extremely encouraging. Emphasis has been primarily on markets in the fur farm and pet food industries as outlets for Lake Erie rough fish.

Many mink ranchers have not resorted to Lake Erie as a source of supply because of lack of information as to the potential of this lake and the limited availability of facilities, such as freezers, in the area. After some initial survey work, it is evident that tremendous supplies of rough fish are available in Lake Erie, particularly in the Sandusky Bay area where haul-seine catches average 75 percent rough fish and, at certain times of the year, go as high as 90 percent.

One of the leading mink ranchers in the world became interested in fish from the Lake Erie area shortly after the Service program was initiated. This rancher surveyed the area completely in cooperation with the Service's market development staff, the Ohio Division of Wildlife, and commercial fishermen. Supply proved no problem, but it was obvious that rough fish removal would be drastically limited by lack of adequate freezing and cold-storage space in the area. Unless some onthe-spot facilities were available, trucking costs to distant freezers would make an operation in this area economically difficult. The groups explored the possibility of establishing large freezers at Sandusky, in the heart of the rough fish area. This seemed promising but costly. Through affiliates on the Pacific Coast, the groups learned of a brine-tank holding method which had proved successful in holding fish in the chilled state for more than a month. A 10,000-pound-capacity tank was assembled on a mink ranch and experiments conducted. The tanks are lined with refrigeration coils which are designed to drop the temperature of the brine solution (3 parts/million) to 28° F. One of the recently-developed antibiotic type products was added to the chilled brine solution to determine the suitability of this procedure for the preservation of fish as a source of mink food. If the tests prove entirely satisfactory, it is anticipated that the company involved will apply this technique on a larger scale in Lake Erie to insure continuing sources of a fishfood product.

Others have looked into the problem of lack of freezer space. A Chicago concern, long active in the vitamin field, recently developed a process which is similar to the meat drum-pack process. In it the rough fish are ground and cooked in vats. After thorough cooking, and the inclusion of a special preservative, it is packed in metal containers with a capacity of 100 pounds each. This product will keep for extended periods in nonrefrigerated storage without spoilage. The cans may be opened and closed repeatedly without any effect on the product. A cannery in the Sandusky area has been found satisfactory for the operation, and a test run using carp has already been conducted successfully. It was anticipated that this plant would be in operation this year, probably during the heavy rough fish production in May and June.

A number of mink feed brokers also plan to truck sheepshead to freezers in Midwestern States. These concerns have already made contacts with Ohio fish producers, and some contracts have been signed for substantial quantities of this year's rough fish production. However, lack of adequate freezer space on Ohio mink ranches precluded extensive storage of Lake Erie fish during the periods when these fish are most plentiful. If adequate holding facilities, such as brine tanks, are made available in the Sandusky area, use of lake fish by Ohio ranchers is expected to increase tremendously.

Considerable effort by the Service's market development staff also was directed to the pet food industry. Although some of the small cat food canneries do use quantities of lake fish, primarily smelt, in their operations, larger concerns are using practically no fresh-water fish in their product. A number of the large pet food concerns have been contacted. Most expressed interest in Lake Erie rough fish and indicated they would investigate the feasibility of using these fish in their operations. One of the leading pet food concerns in the country has for some time planned expansion of its pet food operations. Although it can expand somewhat in its present areas of operation, it would prefer to set up cannery operations in the Midwest. This concern has requested our cooperation in obtaining monthly samples of each of the Lake Erie rough species throughout this coming fishing season. These fish will be thoroughly tested by its research staff, test packs will be made, and feeding trials held. An initial shipment of sheepshead, gizzard shad, burbot, carp, and goldfish has already been sent to this concern for testing. If Lake Erie rough fish can be used, this segment of the industry plans expansion of plant facilities in the Midwest and will use a great deal of rough fish.

Indications are that almost all sheepshead produced in the Lake Erie area will find ready markets in the fur farm industry, once adequate handling facilities are established along Lake Erie's shore. In addition, markets for other species of rough fish, such as carp, goldfish, burbot, and gizzard shad should be forthcoming. Fuller utilization will undoubtedly result if present tests being conducted by pet food canners indicate that Lake Erie rough fish can be used as cat and dog food.

RECOMMENDATIONS FOR DEVELOPING ROUGH FISH MARKETS

We should look at 1956 as a year of experimentation. We hope to see 1957 as a year of utilization. We can look on Lake Erie as the proving grounds for future market development work in the Midwest.

To further facilitate the development of markets for Lake Erie fish, the following program of research is recommended:

- 1. A thorough study of availability of each species of rough fish by area throughout the fishing season. Concise estimates of potential should be obtained from fishermen and by direct observation.
- 2. Species composition of rough fish catches by area throughout the fishing season should be obtained through interviews with fishermen and direct observations and sampling.
- 3. Proximate composition and thiaminase assays of all rough fish species should be determined, by area, at prescribed intervals throughout the fishing season.
- Fur animal nutritional studies, using lake species, should be conducted, if possible. These would have to extend through several generations to be effective.
- 5. Statistical information should be collected which would indicate the amount of rough fish marketed, and its value.
- 6. Establishment of a sound biological program to measure the effect of rough fish removal on other species.
- 7. And last, but not least, a continuing survey of all potential markets for rough fish.

It is readily obvious that the success of any market development program in the Lake Erie area requires the cooperation of market development people, technologists, biologists, and fishermen.

CORRELATION OF pH AND QUALITY OF SHUCKED SOUTHERN OYSTERS¹

E. A. Gardner* and B. M. Watts*

ABSTRACT

From the experiments the spoilage pattern of refrigerated Southern oyster meats was found to be similar, in general, to that reported in other locations. This spoilage is fermentative in nature, characterized by a gradual and continuous decrease in pH and the development of a sour odor. The drop in pH is not necessarily correlated with the sour odor. A seasonal variation in pH, initially and at intervals during subsequent storage at 410 F. (50 C.), has been observed, with the values being lowest during the summer and highest during the winter.

Spoilage patterns and pH changes have been followed also in oyster liquor held under variounditions as compared to oyster meats, in the adductor muscles as compared to the soft tissues, in washed and unwashed oysters, and in homogenized oysters,

INTRODUCTION

The possible usefulness of pH measurements as a reliable objective means of judging freshness in shucked oysters has been suggested in several previous studies. Hunter and Linden (1923) found a relationship between the odor and appearance of Atlantic coast oysters (Crassostrea virginica) and the pH of their liquor. They con-

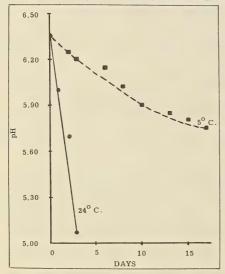


Fig. 1 - pH of shucked oysters held at 41° F. (5° C.) and 75° F. (24° C.) for 15 days.

cluded that oysters passed from good to stale in a zone represented by pH values of about 6.1 to 5.6. From a pH of 5.3 to 4.9 they passed from stale to sour or putrid, and below 5.0 the oysters were described as being in an advanced stage of putrefaction.

In addition to pH values obtained with ground oyster meats as well as oyster liquor, Baldwin, Puncochar, and Pottinger (1941) measured changes in water-soluble nitrogen, alcohol-soluble nitrogen, and total titratable acids during storage of Eastern oysters. From the standpoint of ease, rapidity, and reliability of results, pH values seemed to them to be the most promising of these measurements as an indicator of oyster freshness. They found that the pH of the liquor was initially higher than that of the oyster meats, but both values tended to be equal near the end of a storage period of about a week or ten days. According to their results, they described oysters at a pH of 6.2 to 5.9 as being in a good condition, at pH 5.8 in an "off" condition. at pH 5.7 to 5.5 in musty condition, and at 5,2 and below as sour or putrid.

^{1/} This research was conducted by Florida State University under a contract with the U, S. Fish and Wildlife Service. It was financed with funds provided by Public Law 466, 83rd Congress, approved July 1, 1954 (the Saltonstall-Kennedy Act). The study was made possible through the cooperation of the Oceanographic Institute, Florida State University. *Department of Food and Nutrition, Florida State University, Tallahassee, Fla.

Piskur (1947) concluded that pH measurements may possibly serve as an objective index of the quality of commercially-shucked Pacific oysters (Ostreagigas). In more recent work, Pottinger (1948, 1951), using Eastern oysters, found that the pH continued to decrease during storage in crushed ice, with the oysters becoming progressively more sour and changing markedly in appearance. The time required for an off-odor to develop after the liquor reached a pH of 6.0 or 5.9 varied between three and six days.

In none of the aforementioned studies was any mention made of the mechanisms which might be responsible for the souring, nor were the products which were formed identified. Presumably, acids are formed from the breakdown of glycogen known to be distributed throughout the oyster. It is not known whether this breakdown is due to bacterial action or to glycolytic enzymes within the oyster tissue.

Humphry (1944, 1950), in a basic study of glycolysis in the oyster adductor muscle, demonstrated a relatively slow production of lactic and pyruvic acids in tissue homogenates. He concluded that glycolytic activity in the oyster muscle proceeds at a much slower rate than in mammalian muscle, where all available glycogen is converted into lactic acid within a few hours under anaerobic conditions which develop within the tissue following slaughter. Apparently, no work is available on glycolytic systems in other oyster tissues, although Hatanaka (1941) found that most of the glycogen is in the soft tissues. Bargeton (1941) reported that connective tissue was richest in glycogen.

The present study, conducted from February 1, 1955, to February 1, 1956, was directed toward the correlation of pH and organoleptic changes in the Southern oyster (<u>Crassostrea virginica</u>) under various storage conditions and investigation of the mechanism involved in souring as a basis for appropriate control measures.

EXPERIMENTAL

MATERIAL AND METHODS: All oysters used in this study were of the species Crassostrea virginica, tonged from Cat Point Reef near Apalachicola, Fla. Some were tonged directly and others were purchased either in the shell or freshly-shucked from a commercial packing house in Apalachicola, Fla. The pH of all oysters was measured initially in from 1 to 4 hours after shucking and washing.

All pH measurements were made with a Beckman model H² pH meter using the slurries of 35- to 50-gram (3-4 oysters) random samples of oysters which were blended in a Waring blendor for about two minutes. The odor and appearance of the oysters and liquor were noted at the time pH values were determined. Odor was rated organoleptically by the authors.

RESULTS: Oysters Held at Refrigerator and Room Temperature: Shucked oysters were stored in pint metal friction-top cans at 41° F. (5° C.). To determine the rate at which spoilage would occur in unrefrigerated oysters, some were held at room temperature, 75° F. (24° C.). The pH, odor, and appearance were determined at intervals.

During refrigerator storage, the pH decreased gradually and continuously as the oysters and surrounding free liquor became less fresh in odor and appearance. Odor was noted to pass from fresh to stale, then musty. As the pH decreased, the off-odor became progressively more sour and finally became very sharply sour. At this time the oysters were less firm and were slightly darker and muddy in color. The surrounding free liquor was turbid with many gas bubbles rising to the surface.

When oysters were held at room temperature, the drop in pH was greatly accelerated and accompanied by equally rapid development of sour odor, flabbiness, and gas formation. Spoilage was qualitatively similar to that of refrigerated sam-

ples, but the rate was much more rapid. Figure 1 illustrates the difference in the rate of souring between refrigerated and unrefrigerated samples from one lot of oysters tested during the month of February.

An interesting observation was that shucked oysters stored at 41° F. (5° C.) in glass beakers or in metal cans with loose-fitting aluminum foil covers developed very little or no sour odor, although the pH decreased at the same rate as that of oysters from the same lots in containers with tight-fitting covers.

Seasonal Variations: During the period from February through June it was noted that the mean initial pH for oysters from the monthly sampling decreased slightly during each succeeding month. The range of this decrease was from 6.38 in February to 6.02 in June. This difference represents a real seasonal variation in pH of the oysters. It could not be attributed to increased ambient temperatures during holding and shucking periods, since the low initial pH in June was obtained on oysters that our laboratory workers tonged, placed immediately in iced containers, then shucked and analyzed the same day.

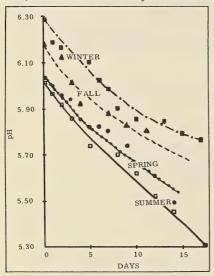


Fig. 2 - Seasonal variations in pH of shucked oysters stored at 41° F. (5° C.) for 15 days.

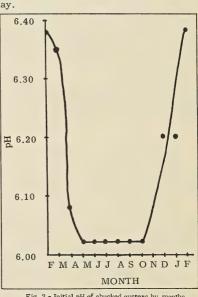


Fig. 3 - Initial pH of shucked oysters by months.

Throughout the spawning period, which in this area extends from April through October, not only did the initial pH remain low (6.02), but also pH values at subsequent storage periods were correspondingly lower. Although the pH initially and at all storage times was lower in the summer than in the winter oysters, the sour odor did not appear at an earlier storage time in the summer. In all oysters, slight offodors began to be detected after 6 to 9 days of storage. After 12 to 16 days of storage they were generally designated sour. Direct odor comparisons of oysters from different seasons could not, of course, be made, but it was the authors' impression that sour odor showed up slightly earlier and became more intense in winter than in summer oysters, although the pH of the winter oysters was higher at all times. Changes in pH are shown in figures 2 and 3.

Oyster Liquor: If the drop in pH of oysters during refrigerated storage is caused by the action of glycolytic enzyme systems within the oyster tissue rather than by bacterial action, it might be expected that liquor, removed from all contact with the oyster meats immediately after shucking, might show little or no drop in

pH on subsequent storage. On the other hand, a drop in pH of oyster liquor which remains in contact with the oyster meats might be expected since acids formed by glycolysis in the oysters could pass out into the liquor. Accordingly, pH changes were followed in (1) the shucking liquor stored separately from the oyster meats, (2) in the "contact" liquor (exuded by the oysters after washing and allowed to remain in contact with the oysters), and (3) in the oyster meats. The shucking liquor was drained from laboratoryshucked oysters, allowed to settle for 5 to 10 minutes to eliminate particles of shell and grit, then decanted and stored at 41° F. (5° C.) in glass beakers covered with aluminum foil. The washed oysters were also stored in glass beakers at the same temperature, and the liquor which was exuded was allowed to remain in contact with the oysters until time for pH determinations.

The initial pH values of both the shucking liquor and the liquor exuded after washing were higher than the initial pH of the oyster meats. The data are plotted in figure 4. In agreement with previous findings by Pottinger (1948, 1951), the pH values of the oyster meats and contact liquor were about equal after 11 days of refrigerator storage. Contrary to ex-

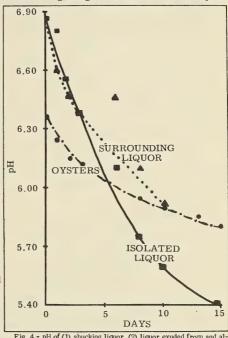


Fig. 4 - pH of (1) shucking liquor, (2) liquor exuded from and allowed to remain in contact with washed oysters, and (3) oyster meats stored at 41° F. (5° C.) for 15 days.

pectations, the pH of the shucking liquor decreased at a much more rapid rate than that of the oyster meats or of the contact liquor. However, while the odor of the oysters and contact liquor was the typical sour one, that which developed in the shucking liquor was predominantly "fishy," resembling that which develops in heattreated oysters in which no drop in pH takes place. Both the shucking liquor and the contact liquor became very turbid.

Since the shucking liquor was not filtered, it probably contained suspended finely-divided particles of oyster tissue which may have supplied both substrate and enzyme systems. Furthermore, Yonge (1926, 1927, 1928) found that the digestive process in the oyster is not confined to the digestive glands, but may be carried out by freely moving phagocytes which may appear in the liquor. The greater drop in pH of liquor as compared to oysters can probably be attributed to its lower buffering capacity. Further study of shucking liquor was made in which some of the liquor was filtered through S&S black ribbon paper. Filtering immediately increased the initial pH of the liquor from 6.90 to 7.30, and as may be seen in figure 5, the pH of the filtered liquor decreased at a slower rate than than that of the unfiltered liquor.

Adductor Muscle and Soft Tissues: To determine the part played by glycolysis in the adductor muscle on the rate and amount of souring in the shucked oyster, the adductor muscle was dissected from some of the oysters and the pH values followed and compared for the whole oysters, adductor muscles, and oysters withmuscles removed, all of which were stored

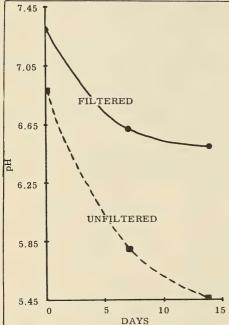


Fig. 5 - pH of filtered and unfiltered shucking liquor stored at 41° F. (5° C.) for 15 days.

The results of this study are presented in figure 6. Removing the muscles did not affect the initial pH of the remainder of the oyster meats, nor did it seem to have any effect on the rate of pH drop during storage for the 15-day period. The pH value of the muscles was initially higher than that of the whole oysters and oysters with muscles removed, and it remained high throughout the study. While the typical sour odor developed in the soft tissues, a "rancid fish" odor was detected

in the muscles before eventual pu-

trefaction.

at 41° F. (5° C.) for 15 days.

Unwashed Oysters Stored in Own Shell Liquor: Observations were made on two lots of shucked oysters stored unwashed in their own shucking liquor in closed metal friction-top cans at 41° F. (5° C.). The pH decreased in these just as it did in drained washed oysters from the same lots, and the typical sour odor developed in each. This is contrary to the findings of King and his associates (1945) who reported putrefaction rather than souring in oysters stored in their own shucking liquor without washing. It is interesting also to note that while

this liquor developed a "rancid fish" odor when it was stored separately from the oysters in glass beakers with aluminum foil covers, it developed a sour odor when allowed to remain in contact with the oysters. In both cases there was an eventual decrease in pH.

Homogenate of Whole Oysters: Changes of pH in homogenates of oysters were also followed with the objective of evaluating the possibility of using homogenized samples for certain other phases of experimentation with oysters in this laboratory. The shucked oysters were homogenized in a Waring blendor and the homogenate then stored in closed metal friction-top cans at 41° F. (5° C.). However, it was found that these blended samples did not follow the spoilage pattern of oysters which were stored unhomogenized. Instead of the usual drop, the pH increased from 6.02 to 6.20 by the eleventh day of storage, at which time there was an extreme ""rancid fish" odor. It was assumed that spoilage predominating in the homogenized oysters was oxidative, involving unsaturated fats which were exposed by blending, since high pH values and a fishy odor are characteristic of oxidative spoilage which has been found by Gardner and Watts (1956) to occur in cooked oysters.

DISCUSSION

The foregoing observations indicate that the spoilage pattern of whole refrigerated Southern oysters is similar, in general, to that reported for oysters in other locations. This spoilage is fermentative in nature, characterized by a gradual and continuous decrease in pH and the development of a sour odor. However, in

the Southern oysters a seasonal variation has been found in initial pH and in pH values at intervals during storage. No particular odor or quality rating of Southern oysters can be correlated with a given pH value during all seasons of the year.

It is interesting to note that the pH, measured initially and at intervals during subsequent storage, is much lower during the summer months when the glycogen content of the oysters is at a minimum. Kokubo (1929) observed that the pH of the blood and pericardial fluid of the oyster (Ostrea gigas) decreased in early summer and increased in winter. He reported that the pH of these body fluids rapidly decreased when the oyster was subjected to respiration in water of high acidity. the lower limit in vivo being pH 5.40. Under these conditions the CO2 content of these body fluids was increased. When oysters were subjected to respiration in water of high alkalinity, the pH of blood and

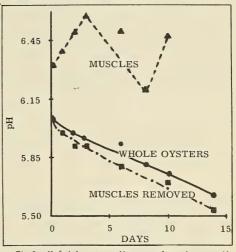


Fig. 6 - pH of whole oysters, adductor muscles, and oysters with muscles removed and stored at 410 F. (50 C.) for 15 days.

pericardial fluid of the oysters rapidly increased to an upper limit in vivo of pH 8.45, and the CO₂ content remained unaffected by the increase in pH. It is possible that the seasonal variation in initial pH of Southern oysters is caused by seasonal change in pH of the water of the oyster beds. These changes in the pH of this water should be followed in any future work to shed further light on the value that can be assigned to pH as a test for quality of oysters.

Another possibility is that the composition of the oyster during the summer months, or spawning period, is such that the more acid parts of the organism contribute more to the pH of the whole oyster than they do during the winter months. For example, the style and the stomach were found by Yonge (1926-1927) to be the most acid parts of the oyster, with a pH of 5.2 and 5.5, respectively. It would be interesting to follow the seasonal pH of the various tissues and to compare these values with the pH of the whole oyster.

The initial pH of the adductor muscle, although higher than that of the soft tissues, apparently has no effect on the initial pH of the whole oyster, since the initial pH values of whole oysters and of oysters with muscles removed were identical. Furthermore, glycolysis in the adductor muscle appears to have no effect on the rate of souring in the whole oyster. This stands to reason, since the percentage of glycogen in the adductor muscle has been found by Hatanaka (1941) to be small as compared to that in the soft tissues. Ashikaga (1949) reported that glycogen in the whole oyster decreased to only 3 percent of the original after five days and was lost entirely after ten days when oysters were held at 37° F. (2.8° C.). After 5 and 25 days at 2°-4° F. (-17° to -15° C.), the percentages of glycogen remaining

were 83 percent and 63 percent, respectively. However, when fresh adductor muscles were stored at 6-9 $^{\circ}$ F. (-14.5 $^{\circ}$ to -12.8 $^{\circ}$ C.), they contained about 71 percent of the original glycogen after three days. When the muscles were dried and preserved, the loss of glycogen was only 8.25 percent even after two years.

Considerable evidence has been accumulated to indicate that acid production resulting in the drop in pH is not necessarily related to the development of the sharp sour odor. While oysters stored in containers with tight-fitting covers decreased in pH and developed a sharp sour odor, it was observed that oysters from the same lot stored at the same temperature in containers with loose-fitting covers also decreased in the pH at the same rate, but developed little or no sour odor before ultimate putrefaction. Shucking liquor, stored separately from oyster meats, also decreased in pH, but developed a "rancid fish" odor rather than a sour odor. Oysters tonged during the summer months dropped to a very low pH (5.52-5.69) before a sour odor became evident. Conversely, Gardner and Watts (1956) have found it possible to produce the sour odor with very little or no drop in pH by heating the oysters just enough to partially inactivate the enzyme catalase. Explanations of these observations cannot be made until the mechanisms involved in spoilage are elucidated. By subjecting the oysters to sterilizing doses of radiation it may be possible to eliminate bacteria with only minor alteration of the enzyme systems within the oysters, and thus the role in oyster spoilage played by these two mechanisms may be revealed. Such work is in progress in this laboratory and will be reported on a later date.

SUMMARY AND CONCLUSIONS

The spoilage pattern of refrigerated Southern oyster meats was found to be similar, in general, to that reported in other locations. This spoilage is fermentative in nature, characterized by a gradual and continuous decrease in pH and the development of a sour odor. The drop in pH is not necessarily correlated with the sour odor. A seasonal variation in pH, initially and at intervals during subsequent storage at 41°F. (5°C.), has been observed, with the values being lowest during the summer and highest during the winter.

Spoilage patterns and pH changes have been followed also in oyster liquor held under various conditions as compared to oyster meats, in the adductor muscles as compared to the soft tissues, in washed and unwashed oysters, and in homogenized oysters.

LITERATURE CITED

Ashikaga, C.

1949. Biochemical Studies on the Pearl Oyster, Pinctada martensi. II. Changes of Glycogen Content During the Process of Preservation. Journal of the Agricultural Chemical Society of Japan, vol 23, pp. 63-65. (Chemical Abstracts 1950.)

Baldwin, W. H.; Puncochar, J. F.; and Pottinger, S. R.

1941, Some Preliminary Studies on the Relative Value of Methods for Indicating the Quality of Shucked (Eastern) Oysters, U, S, Fish and Wildlife Service, Bulletin F, I, 2469-K.

Bargeton, M.

1941. Vesicular Cells Containing Glycogen. The Distribution of Glycogen in Earthworms and Oysters. Museum of National Histoire Naturelle, Bulletin 13.

Gardner, E. A.; and Watts, B. M.

1956. Investigations of Deterioration of Cooked Oysters. Unpublished.

Hatanaka, M.

1941. Chemical Composition of the Oyster, Ostrea gigas Thunberg. Zeitschrift fur Untersuchung von Lebensmittel, vol. 81, p. 72. (Chemical Abstracts 1942.)

Humphry, G. F.

- 1944. Glycolysis in Extracts of Oyster Muscle. Australian Journal of Experimental Biology and Medical Science, vol., 22, pp. 135-138.
- 1950. Glycolysis in Oyster Muscle. Australian Journal of Experimental Biology and Medical Science, vol. 28, pp. 151-160.

Hunter, A. C.; and Linden, B. A.

1923. An Investigation of Oyster Spoilage. American Food Journal, vol. 18, no. 11 (November), pp. 538-540.

King, W. H.; Flynn, F. F.; and Gowanloch, J. W.

1945. Experimental Studies on Decomposition of Oysters Used for Canning. Journal of the Association of Official Agricultural Chemists, vol. 28, pp. 385-398,

Kokubo, S.

1929. The pH and Carbon Dioxide Content of the Blood, Pericardial Fluid, and the Body Fluid of the Oyster with Special Reference to Their Response to the Altered Condition of Sea Water, Science Reports of the Tohoku Imperial University, 4th series, vol. 4, pp. 207–257. (Chemical Abstracts.)

Piskur, F. T.

1947. Preliminary Study of Correlation of pH and Quality of Shucked Pacific Oysters. Commercial Fisheries Review, vol. 9, no. 6 (June), pp. 22-24.

Pottinger, S. R.

- 1951. A Study of pH of Strictly Fresh Commercially Shucked Eastern Oysters. Commercial Fisheries Review, vol. 13, no. 11a (November), pp. 8-10.
- 1948, Some Data on pH and Freshness of Eastern Oysters, Commercial Fisheries Review vol. 10, no. 9 (September), pp. 1-3.

Yonge, C. M.

- 1926-1927. Structure and Physiology of the Organs of Feeding and Digestion in Ostrea edulis. Journal of the Marine Biological Association of the United Kingdom, vol. 14, pp. 295-386.
- 1928. The Absorption of Glucose by Ostrea edulis. Journal of the Marine Biological Association of the United Kingdom, vol. 15, pp. 643-653.



OYSTER DRILL--THE OYSTER'S ENEMY

The oyster drill is one of the most serious problems facing the oyster industry, and effective control methods would be a tremendous boon to growers and harvesters of this shellfish.

The oyster drill, <u>Urosalpinx cinerea</u>, may add variety to its oyster menu in the form of mussels and barnacles. There is also evidence that cannibalism occur's among adult drills, and a variety of other mollusks, such as soft and hard clams, and scallops may also fall before this voracious predator. At times even small crabs, the carrion of fish or such lower invertebrates as encrusting bryozoans are devoured.

--"Sea Secrets," The Marine Laboratory, University of Miami, Coral Gables, Fla.

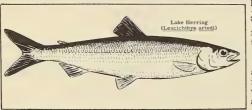


COLD STORAGE LIFE OF FRESH-WATER FISH--NO. 31

(Lake Herring, Northern Pike, and Whitefish)

INTRODUCTION

The various species of fresh-water fish constitute a valuable source of highquality proteinfood in the United States. Notwithstanding this fact, relatively little is known about the frozen-storage characteristics of these fish. Data on their coldstorage life, if available, would greatly assist the producer in selecting the best



handling procedures and in adjusting to fish-marketing changes. The data would also help the sports fishermen to make better use of their catches.

A project designed to evaluate the frozen-storage characteristics of certain species of freshwater fish was started at the Seattle Technological Laboratory about 5 years ago. The first re-

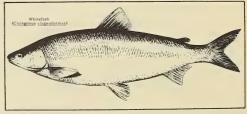
port of the findings was published in the September 1954 (Myauchi and Stansby 1954); the second, in November 1955 (Osterhaug and Myauchi 1956). In this paper, the results of cold-storage tests on three new species (lake herring, Leucichthys artedi; northern pike, Esox lucius; and whitefish, Coregonus clupeaformis), are reported.

COLLECTION AND TREATMENT OF SAMPLES

The fish used in this study were collected in Minnesota. Samples of the lake herring and of the whitefish were stored in the round as well as in other market forms. The northern pike were stored only as fillets.

Three lots of fish, one for each species studied, were shipped from the point of collection to the Seattle laboratory. The lake herring and the whitefish were shipped frozen, and the northern pike was shipped iced.

The two lots of frozen fish (lake herring and whitefish) were frozen in commercial freezers,



packed in suitable containers with dry ice, and shipped to Seattle by express or air freight. The two lots, which were received in good condition, were placed immediately in storage at 0° F.

1/ This work was carried out under a project financed in part by the Refrigeration Research Foundation.

The single lot of iced fish (northern pike) was shipped in the round from Litchfield, Minn., on February 1, 1955, and arrived, well iced, in Seattle on February 3. The fish were held overnight at the laboratory in storage at 34° F. before being filleted and packaged for freezing. The individually cellophane-wrapped fillets were frozen on shelves in a room at -20° F. and then were packed in waxed cartons and stored at 0° F.

RESULTS AND DISCUSSION

Table 1 gives data on the cold-storage history of the three species of fish, Owing to the small samples of fish received the initial zero-storage organoleptic tests of these widely-accepted fish (lake herring and whitefish) were omitted.

					Cold-Storage Life of C	ertain Fresh-Wate	er Fish Stored 0°	F	00 70	
Common	Scientific		ption of S Date	mple Method of	Packaging Used for		T	Samples Stored at	1	
Name	Name	Source	Caught	Shipping	Storage	3 Months	5 Months	7 Months	9 Months	11 Months
Lake herring (South Shore)	Leucichthys artedi	Lake Superior, (Duluth, Minn.)	Dec. 1, 1954	Frozen	In the round, glazed; packed in 5-pound wax cartons, over- wrapped with wax paper heat-sealed.	Firm and bright but with slight reddish discol- oration in belly cavities of some fish; some off-fla- vor.	Texture tender, moist, and firm; bright; flavor bland.	Texture soft; meat mottled pink with yel- low spots near nape; flavor "mud- dy" or "scorched"	Rancid	Rancid
							(very good)	(not acceptable)	(not acceptable)	(not acceptable)
					Scaled, headed, and gutted; packed in 1-pound cartons; overwrapped with 450 MSI cello- phane, heat sealed.	Texture tender and moist; flavor good.	Texture firm; slight dis- coloration of nape; flavor good.	Texture firm; considerable discoloration of nape; slight off-flavor in nape and belly cavity.	Texture firm; skin had dark- ened, nape and belly cavity showed yellow discoloration; slight rancidity of nape and bel- ly cavity.	Rancid
					Edition and and an	Texture moist	(good) Texture moist	Some yellow	(acceptable?)	(not acceptable)
					Fillets packed in 1-pound waxed cartons, over- wrapped with 450 MSi cellophane, heat sealed.	and tender; flavor good, similar to lake smelt or silver smelt.	and flaky; two fillets had yel- low spots on meat; flavor mild with no off-flavors noted.	discoloration over surface of fillets; some rancid- ity noted in dark meat, nape area, and edges of belly cavity. (acceptable)	Texture firm but spongy with excess expressible liquid; sur- face of meat yellow; some rancidity throughout. (notacceptable)	Rancid (not acceptable)
						1 Month	2 Months	3 Months	4 Months	7 Months
					Breaded fillets packed in 1- pound waxed cartons, over- wrapped with 450 MSi cello- phane, heat sealed.	Good	Good	Fried fillets had very good flavor.	Two of the baked fillets had a slight rancid flavor.	Skin of baked fillets slightly rancid, meat mild to flat.
					seated.	0 Months	3 Months	(acceptable) 6 Months	(acceptable) 9 Months	(acceptable) 12 Months
Northern pike	Esox lucius	Litchfield, Minn.	Feb. 1, 1955	Iced	Fillets, wrapped in MSAT cello- phane, packed in waxed carton.	Texture soft; flavor bland.	Texture firm, tender and flaky; meat white; flavor mild and pleasant.	Meat had dark- ened; some rancidity.	Texture firm; meat had dark- ened; moderate to strong ran- cidity. (not acceptable)	Discontinued
White- fish1/	Coregonnus clupea- formis	Red Lake, Minn.	Aug. 15, 1954	Frozen	In the round, packed in poly- ethylene bags.	-	Variable; sample in- adequate in size.	Slight darken- ing along backbone, no off-flavors or rancidity.	Texture firm; reddish color along back- bone and belly wall; some ran- cidity in fat.	Texture soft; dark meat was brown; slight rancidity in dark meat.
1								(acceptable)	(acceptable)	(not acceptable)
					Eviscerated, packed in poly- ethylene bags.	-	-	-	Texture firm, meat white; flavor normal, (acceptable)	No further samples avail- able.
					Fillets, wrapped in MSAT cello- phane.	-	Samples not adequate for judging.	Slight darken- ing around edges and along center line; off-fla- vors in tail portion and posterior belly flaps; fat slightly ran- cid. (acceptable)		Texture firm; yellow-brown discoloration; moderate a- mount of ran- cidity through- out. (not acceptable)
1/70	a-month o	ranolan	tic test	c omitto	d owing to small	aire of access	1			
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The northern pike, which were shipped iced and then filleted before being frozen, remained acceptable through 6 months of frozen storage. By 9 months, the meat had darkened somewhat, and moderate to strong rancidity had developed.

The whitefish were found to be acceptable through 9 months of storage. By 12 months, all of the samples had darkened in color and were slightly to moderately rancid.

The lake herring that had been frozen and stored in the round were judged not to be acceptable at the seventh-month examination, owing to discoloration and autolytic breakdown in the belly cavity. The meat along the belly flaps was strongly mottled from gray to brownish red, with yellowish spots near the nape. There was also a strong tendency for the rib bones to protrude into the belly cavity. Strong "muddy" or "scorched" off-flavors were noted. After 9 months of storage these samples were also rancid.

The lake herring that had been scaled, headed, and gutted before being frozen remained "acceptable" through the ninth-month examination, but they were judged "not acceptable" at 11 months, owing to the development of rancidity. These fish might have had a longer frozen-storage life if the original cleaning of the belly cavity had been more thorough.

Frozen fillets of lake herring remained acceptable through the seventh-month examination, but by the ninth-month examination they had become spongy in texture and somewhat rancid throughout.

Frozen breaded fillets of lake herring remained acceptable through 7 months of storage. No further storage was possible because, at that time, the samples were used up.

FRESH-WATER FISH CURRENTLY UNDERGOING STORAGE TESTS

Because the storage tests reported here are based on only single batches of each species and because many of the variables remained uncontrolled, these results cannot be considered as determining conclusively the storage life of these species. To employ our limited resources more efficiently, we have decided therefore to concentrate on a single species of fish during the coming year and thereby obtain better control of the many variables. The species chosen is lake herring from Lake Superior and Lake Huron. The results of this investigation, when completed, will be given in the next report on this project.

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BIBLIOGRAPHY

Miyauchi, D. T., and Stansby, M. E.

1954. Cold-Storage Life of Fresh-Water Fish--No. 1. Commercial Fisheries Review, vol. 16, no. 9, September, pp. 18-20.

Osterhaug, Kathryn L., and Miyauchi, D. T.

1955. Cold-Storage Life of Fresh-Water Fish--No. 2. (Yellow Perch, Crappie, White Bass, Utah Chub, and Squaw-fish). Commercial Fisheries Review, vol. 17, no. 11, November, pp. 19-21.



COLD-STORAGE STUDIES ON GULF OF MEXICO YELLOWFIN TUNA

Exploratory studies to anticipate, and possibly forestall, technological problems in the newborn Gulf tuna industry are being conducted. Thirty-nine yellowfin tuna were frozen in brine tanks and in refrigerated dry-wells aboard the fishing vessel or in warehouse freezers ashore. The fish (from 40 to 150 pounds each) were studied by Service technologists, and then were placed in frozen storage. They will be examined at periodic intervals to determine the storage effects, if any, upon the color and flavor of the meat. Individual fish will be processed and canned at inter-

vals during the storage period for studies of the effects of processing after prolonged storage periods.

The tuna were taken by the Service's exploratory fishing vessel <u>Oregon</u> during long-line fishing operations off the delta of the Mississippi River. The cruise, one of many during the past year, was designed to further test the commercial feasibility of a year-round tuna fishery in the Gulf area. A canning expert from the Service's Technological Section supervised preparation of the samples.



FUNGICIDAL PROPERTIES OF MODIFIED UNSATURATED FISH OILS

Comparative studies made at Florida Southern College of the fungicidal activities of inorganic copper salts and of a modified unsaturated fish oil showed the fish

oil to be approximately 32 times as active in preventing mold development. The inorganic salts studied (commonly used as fungicidal agents) were copper sulfate and basic copper acetate; the fish oil was modified by chemically uniting it with a quaternary ammonium compound. The work was sponsored by the Service with funds made available by Public Law 466, the Saltonstall-Kennedy Act of 1954. A potentially large field of application for fish oils will be opened if the research is successful.

The comparative degrees of growth of a mold, Candida albicans, in cultures containing the above salts or the modified fish oils were studied. The culture, containing approximately nine ten-thousandths of an ounce of modified unsaturated fish oil per gallon, evidenced no growth of the mold, while those containing much larger quantities of the two copper salts were quickly overgrown with the mold. Further studies are continuing.

This work is the result of one phase of a general program dealing with research on the insecticidal, fungicidal, and nematoridal characteristics of fish of



Experimental pump and probe disigned to introduce fish oil nematocides into the ground surrounding the roots of citrus trees threatened by the "spreading-decline" nematode.

and nematocidal characteristics of fish oils. Results to date have been promising in both the fungicidal and nematocidal fields. Research on the latter field is now out of the laboratory and into the pilot-study phase. Problems of application of the nematocidal fish oils to nematodes in the underground roots of citrus trees are being studied.

Note: See Commercial Fisheries Review, March 1956, p. 9; June 1956, p. 13.



NORTH ATLANTIC SHRIMP KEEPING QUALITY IN COLD STORAGE

Gulf of Maine or Northern shrimp were found to have good keeping quality when brine-frozen with heads on aboard the Service's exploratory fishing vessel $\underline{\text{Dela-}}$ ware, and then ashore thawed, processed, packaged, refrozen, and stored at $0^{\rm o}\,{\rm F.}$ under conditions approximately equivalent to commercial practice. The samples were considered of "commercially-acceptable" quality after 14 months' storage (the period of the last examination).

On June 6, 1955, supplies of Northern shrimp, <u>Pandalus borealis</u> (average heads-on length 3.5 inches) were caught by the research vessel during exploratory fishing operations in North Atlantic waters. These were promptly brine-frozen with heads on at 0 $^{\circ}$ to 5 $^{\circ}$ F. aboard the vessel and stored at about 5 $^{\circ}$ F. in the fish hold. Sample lots of the frozen shrimp, after landing, were distributed to local processors for evaluation. A small representative lot was processed for storage tests at the laboratory.

The samples were prepared for storage as follows: the thawed shrimp were beheaded; washed in fresh water; packed in waxed cardboard cartons (5-lb. size); and refrozen in a plate freezer at -20° F. The carton lids were then removed, and the shrimp were glazed by dipping twice in water at 32 to 35° F.; after which the lids were replaced. The cartons were overwrapped with aluminum foil and finally with kraft wrapping paper to protect the foil. The packages were stored at 0° F.

Organoleptic observations of the raw and cooked shrimp were carried out at periodic intervals. The shrimp showed a white mottling of the shell which was believed due to local dehydration resulting from the brine-freezing operation. This detracted somewhat from the appearance but was not considered serious by those examiners who understood the nature of the spotting. The periodic examinations revealed the following:

INITIAL EXAMINATION: Color was a pleasing light pink; flavor was mild, pleasing, and sweet, and the texture was tender. Over-all rating was "like very much."

SIX MONTHS' STORAGE: Color was a good pink but slightly dull. Flavor was considered to be good with no off-flavors, and the texture was firm. Over-all rating was "like moderately."

NINE MONTHS' STORAGE: Color was fair, but there was some slight yellowing; flavor was fair, lacking the characteristic sweet flavor, but with discernible off-flavors; texture was firm and approaching the slightly tough stage. Over-all rating was between "like slightly" and "like moderately." (The rating "like slightly" is considered to be the lower limit of commercial acceptability.)

FOURTEEN MONTHS' STORAGE: Color was fair, showing slight yellowing; flavor was fair, lacking the characteristic sweet flavor, but with no discernible off-flavors; texture was satisfactory, but appeared to have become softer. Overall rating was between "like slightly" and "like moderately."



TECHNICAL NOTE NO. 34 - GROWTH CHARACTERISTICS OF THE PINK YEAST THAT CAUSES DISCOLORATION OF OYSTERS

Oysters of the finest grade and free of defects when packaged were found to have pink spots after being held in frozen storage for various periods of time and then thawed, and the thaw liquor was found to have a pink color. A study was undertaken to determine the cause of this phenomenon. The literature indicated that

the agent causing the pink discoloration is a supposedly asporogenous yeast belonging to the genus Torulaceae. The work reported here, however, showed that the pink yeast may produce ascospores.

EXPERIMENTAL

A representative sample consisting of four oysters with pink spots was thawed, removed from the package, and blendored in a sterile Waring Blendor jar. The resulting disintegrated homogeneous material was used to inoculate tubes of Sabouraud's broth media. Subsequently, Sabouraud's agar plates, to which had been added one drop of sterile 50-percent lactic acid prior to pouring the agar, were streaked



Fig. 1 - Pink yeast culture showing asci and ascopores.

from the growth that developed in the broth tubes. (The lactic acid reduces the overgrowth of colorless colonies that interferes with the growth of the pink yeast. The organism causing this growth is a gram positive rod that possibly may become chromogenic under proper conditions.) After 3 to 4 days of incubation at room temperature, pink colonies appeared on the plates.



Fig. 2 - An ascus with ascopores enclosed in sac.

These colonies were confluent, shiny, butyrous, and pink; and a few were discrete. A smear made from a colony, after being stained with methylene blue and examined under oil immersion, showed yeast cells, some of which were budding. Fresh preparations were studied under the microscope over the period of an hour or two-depending upon the evaporation of the media--and each ascus! was noted to contain from one to four ascospores. 2 Seven to eight transfers were made of the cultures, and each showed the same characteristics of growth, indicating that each was pure. The final culture was then allowed to remain undisturbed at room temperature on a Sabouraud's agar slant for 4 years? in large test tubes that were tightly sealed.

After this long dormant period, the culture was examined for the presence of spores by the method of Dorner, as is recommended in the Manual of Methods for

^{1/} Ascus--the membranous oval or tubular spore sac in ascomycetes.

Ascospore--one of the spores contained in an ascus.

^{3/} This long period of time was made necessary by work on other projects.

<u>Pure Culture Study of Bacteria</u>. Ink Powder (<u>Nigrosin Electroencephalograph</u>) was used for the counterstain (pure nigrosin powder was not available). Microscopic ex-



Fig. 3 - Pink yeast growing on a plate of Sabouraud's agar.

amination showed that the culture contained asci, each of which had from one to four ascospores (fig. 1 and 2).

To determine if these 4-year-old cultures could still be revived, I inoculated Sabouraud's broth tubes with them. The pink yeast colonies grew satisfactorily (fig. 3); the surface contour of the cells appeared to be normal (fig. 4); and the cells were found to bud normally, and no spores were present (fig. 5).

DISCUSSION

It was noted about 6 years ago that pink yeast would grow and form pigment at temperatures down to -35° F. (McCormack 1950). Since that time, there has been a greatincrease in the quantity of oysters held under frozen storage, with some evidence of a higher incidence of

losses due to pink yeast. During the early part of the present oyster season, for example, there was considerable concern over the problem of colored oysters.



Fig. 4 - The surface contours of pink yeast cells appear normal.



Fig. 5 - A culture showing budding cells but no spores.

The facts reported here that pink yeast produces spores suggest that the avenues of contamination are likely to be much more numerous than was formerly believed when only the vegetative form of the organism was studied by itself. On the basis of our present incomplete knowl-

edge, however, we can conclude only that there is greater need for further research on this and other causes of pink and red color in shucked oysters.

--BY GRACE MCCORMACK, FORMERLY BACTERIOLOGIST, FISHERY TECHNOLOGICAL LABORATORY, U. S. FISH AND WILDLIFE SERVICE, COLLEGE PARK, MD. NOW BACTERIOLOGIST, VETERANS ADMINISTRATION HOSPITAL, CANANDAIGUA, N. Y.

BIBLIOGRAPHY

Committee on Bacteriological Techniques

1932-1950. Manual of Methods for Pure Culture Study of Bacteria. Society of American Bacteriologists, Geneva, New York.

Henrici, Arthur T.

1930, Molds, Yeasts, and Actinomycets. John Wiley and Sons, New York, N. Y., pp. 200-201.

McCormack, Grace

1950, Technical Note No. 5--"Pink Yeast" Isolated From Oysters Grows at Temperatures Below Freezing, Commercial Fisheries Review, vol. 12, no. 11a, November, p. 28,

Skinner, Charles E.; Emmons, Chester W.; Tsucheya, Henry M.

1947. Henrici's Molds, Yeasts, and Actinomycets, Second edition, John Wiley and Sons, New York, N. Y., p. 302.



FROZEN FISH FILLETS AND STEAKS IDEAL PROTEIN FOODS

Frozen ocean perch, cod, and haddock fillets, and halibut steaks are recommended by the U. S. Fish and Wildlife Service as ideal protein foods.

Fillets are the sides of the fish cut lengthwise away from the backbone. They are practically boneless and have little or no waste. Steaks are cross-section slices of the larger sizes of dressed fish, usually about $\frac{3}{4}$ of an inch thick.

Frozenfillets and steaks may be thawed prior to cooking. Normally, it is suggested that they be thawed overnight in the refrigerator or left at room temperature for 3 to 4 hours. However, if you're in a hurry, the fillets or steaks may be cooked without thawing if additional cooking time is allowed.

Fillets or steaks may be prepared by any of the basic cooking methods of frying, baking, broiling, and steaming, or in an endless variety of combination dishes.

The important thing to remember in cooking fish, however, is that it must not be overcooked. Just enough cooking for the meat to flake easily will leave the fish moist and tender and bring out the delicate flavor.

The home economists of the Fish and Wildlife Service recommend Ocean Perch Creole as a delectable but economical and easily-prepared protein dish.

OCEAN PERCH CREOLE

2 POUNDS OCEAN PERCH FILLETS

1/4 CUP BUTTER OR OTHER FAT

2 TABLESPOONS FLOUR

2 CUPS TOMATO JUICE

2 TABLESPOONS CHOPPED ONION

 $\frac{3}{2}$ TABLESPOONS CHOPPED PIMIENTO $\frac{1}{2}$ TEASPOON SALT

DASH PEPPER RICE RING

Skin fillets and cut into one-inch pieces. Melt butter, blend in flour and add all remaining ingredients except rice. Cook, stirring occasionally, about 15 minutes or until fish flakes easily when tested with fork. Serve hot in rice ring. Serve 6.



California

1956/57 SARDINE SEASON OFF TO A GOOD START: The total catch of the sardine purse-seine fleet in Southern California through October 19 totaled 23,000 short tons, or 240 percent more than the 6,750 tons landed as of the same date in 1955. However, fishing out of San Pedro in 1955 did not start until November 7, according to a report from the Service's Market News Reporter in San Pedro.

The catch during the night of October 16, the last night of the recent series of dark nights, amounted to 5,500 tons, the best single night's fishing since the night of October 5, 1951, when 7,460 tons were caught. The big catches of October 16 were due to successful scouting by airplanes and the fact that the fleet concentrated near the huge schools located between Del Mar and La Jolla. Of the 75 vessels fishing in that area, one vessel made an all-time record catch for a San Pedro vessel of 230 tons and 27 other purse seiners had catches of over 100 tons each.

Both the fishermen and the canners seem to be satisfied with the ex-vessel price of \$47.50 a ton, and canners are willing to take all the sardines landed. Market conditions appear favorable for the canned sardine pack and present indications are that the catch for the 1956/57 fishing season may equal or exceed the 73,000 tons caught in the 1955/56 season.

* * * * *

PERIODIC FLIGHTS TO STUDY PELAGIC FISH DISTRIBUTION (Airplane Spotting Flight 56-7): In order (1) to study pelagic fish distribution, abundance, and behavior in southern California, (2) to become familiar with airplane landing fields and facilities in northern and central Baja California, and (3) to locate areas of fish concentration, the California Department of Fish and Game Cessna 1359D conducted a flight August 22-28, 1956. The inshore area between Pt. Conception, Calif., to Turtle Bay, Baja California, was surveyed.

In southern California (Pt. Conception to San Diego) Pacific mackerel and sardine schools increased in abundance in the inshore area since June 1956 and conversely anchovies decreased in abundance. Commercial fishing operations revealed the presence of sardine and Pacific mackerel schools around the offshore islands but these areas could not be covered on this flight.

Anchovy: As in June, the largest concentration of anchovies appeared in the Pt. Pitas-Ventura regions. In all areas, except near Gaviota, there was a decrease in anchovy concentration since the last flight in June. A total of 550 anchovy schools (5,818,900 square feet of fish) were observed from Gaviota to Coronado, with the largest concentration in the Pt. Pitas-Ventura region.

Sardine and Pacific Mackerel: Schools of Pacific mackerel appear to be more abundant this season than in the past several seasons. Pacific mackerel schools were observed in the Laguna, Newport, and Oceanside areas and were also reported around the offshore islands.



Airplane spotting flight 56-7 (August 22-23, 1956)

Sardine schools were observed near Pt. Conception, Pt. Mugu, Pt. Dume, and in the Oceanside region. It is still too early to estimate comparative abundance with past seasons but it appears that the distributional pattern is remaining quite similar to that of 1955.

A total of 59 sardine schools (445,000 square feet of fish), 22 Pacific mackerel schools (124,100 square feet of fish), and 87 mixed sardine-Pacific mackerel schools (422,800 square feet of fish) were observed from Pt. Conception to Oceanside.

The purpose of the Baja California scouting was to locate areas of fish concentration and to survey airplane landing fields and facilities. No attempt was made to count and measure schools of fish observed. The section of coast between the California-Mexico border and Ensenada contained several small school groups of "flashing" fish that were probably sardines or



rplane spotting flight 56-7 (August 25-28, 1956)

Pacific mackeral or both. Anchovies were present in Ensenada Bay, but in fewer numbers than in June. No fish schools were seen in the area between Ensenada and Cape Colnett. The area between Cape Colnett and Sacramento

Reef contained an almost continuous band of anchovy schools close to the beach. Many more anchovy schools were present in this area than previously observed in Baja California.

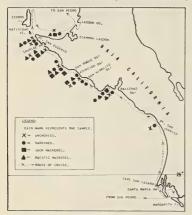
From Sacramento Reef to Lagoon Head, Sebastian Vizcaino Bay, there were several small schools scattered along the coast. These schools were probably sardines but good identification was not possible. From Lagoon Head to Pt. Eugenio many schools of sardines were observed. All these schools were small crescent-shaped surface schools.

Many small schools of unknown identity were observed in the area from Pt. Eugenio to Turtle Bay.

* * * * *

SURVEY BY "N. B. SCOFIELD" TO ASSESS RELATIVE ABUNDANCE OF SARDINES (Cruise 56-5-4): This was the first of the 1956 survey cruises designed to assess the relative abundance of sardines resulting from the 1956 spawning and the relative abundance of older sardines, Pacific mackerel, and jack mackerel. Since the M/V Yellowfin has been taken out of service, this and subsequent 1956 survey cruises will be carried out by the research vessel N. B. Scofield of the California Department of Fish and Game. The vessel, which sailed July 27 and returned August 16 to Los Angeles Harbor, worked along the coast of Baja California from Point Eugenia to Magdalena Bay and the area on the east side of Cedros Island.

A total of 61 light stations were occupied. Sardines were sampled at 16 stations, Pacific mackerel at 11, jack mackerel at 6. Of the 16 stations at which sardines were taken, 14 yielded 1956 spawned fish (125 mm, standard length or less).



N. B. Scofield (Cruise 56-S-4), July 27-Aug. 16, 1956.

and five yielded adult sardines. In general, sardines appeared to be less abundant than the 1955 survey of this area indicated--28 percent of all stations of this 1956 cruise yielded sardines as compared with 45 percent of the 1955 survey over the same area.

The vessel scouted for pelagic fish a total of 368 miles; 216 schools were observed, of which it was estimated that 20 contained sardines, 20 mackerel, 80 anchovies, 8 large tunalike fish, and the remaining 88 could not be positively identified from the vessel.

Sea surface temperatures, bathythermograph casts, and reversing thermometer casts were taken at each station regardless of whether fish were observed or collected. Surface temperatures throughout the cruise ranged from a minimum of 17.10°C. (62.8°F.) at two miles south of Point Eugenia to a maximum of 26.90°C. (80.4°F.) at Magdallena Bay. Sardines were sampled where surface temperatures ranged from 17.10°C. (62.8°F.) to 26.89°C. (80.4°F.).

YELLOWFIN AND SKIPJACK TUNA TAGGED AND MEASURED BY CLIPPER "ELSINORE" (Cruise 56-C-4): Tagging and measuring yellowfin and skipjack tuna

* * * * *

were the principal objectives of the tuna clipper Elsinore during a cruise conducted by the California Department of Fish and Game. The vessel sailed on July 21, 1956, and returned to San Diego August 18, 1956.

During this cruise 26 yellowfin and 767 skipjack tuna were tagged. To test the effect of color on recovery, tags of three different colors in sequences of five each were used. Nine night-light stations were occupied. Seven series of measurements were made of seven separate schools of tuna (six skipjack and one yellowfin tuna). A total of 43 bottles and 15 packages of frozen specimens were collected. These specimens are presently being analyzed. Limited oceanographic observations were also made.



M/V Elsinore tuna tagging (July 21 to Aug. 18, 1956).



Canned Fish Consumer Preference Study

TUNA MOST POPULAR CANNED FISH: Canned tuna was served at least once during the 12 months prior to July 1, 1956, in 76 percent of all households in the United States. Canned salmon was served in 69 percent, and sardines in 50 percent of the households.

The relative ranking of these three species of fish varies somewhat among regions. Canned tuna was most popular in the West, being served in approximately

Percentage of Households Serving Canned Fishery Products, July 1955-June 1956						
	Regions					
Type of Canned Fish- ery Products Served	U.S. Total	North east	North Central	South	West	
		(Percent 1	/)		
Tuna	76.1	83.4	71.7	68.9	87.7	
Salmon	68.8	59.7	75.4	73.6	62.1	
Sardines	50.3	45.9	51.1	54.6	47.8	
Shrimp	24.0	26.6	19.4	15.9	46.5	
Oysters	22.5	14.2	25.3	22.5	32.6	
Crab meat	16.7	26.4	7.1	12.9	26.9	
Mackerel	10.0	5.0	9.6	17.3	4.2	
Clams	8.2	12.3	2.6	4.0	21.1	
No. of Households	2,770	734	805	848	383	
1/ Percentages total to more than 100 because respondents served more than one product.						

88 percent of the homes. Canned salmon was most frequently used in the North Central region where it was more popular than canned tuna, 75 percent to 72 percent, respectively. Canned sardines were used most often in the South where 55 percent of the housewives served them.

Canned shrimp

and canned oysters were less widely distributed, with each being served in about 23 percent of the homes on a national basis. The percentage of families using both of these shellfish items was greatest in the West. The use of canned shrimp was lowest in the South (16 percent), while the serving of canned oysters was lowest (14 percent) in the Northeast.

These findings are based on a June 1956 scientific sample survey of 2,700 households distributed throughout the United States. These data on percentage of households serving various kinds of canned fish and shellfish are one part of a large amount of other data obtained on household consumers' preferences for canned fish and shellfish.

Final results of the survey, which is being financed by funds made available by the Saltonstall-Kennedy Act of 1954, are scheduled for publication the early part of 1957. The U.S. Fish and Wildlife Service contracted with the W.R. Simmons and Associates Research, Inc., of New York City to conduct the survey.

Note: Also see Commercial Fisheries Review, August 1956, p. 47.

* * * * *

CANNED TUNA PACKED IN OIL PREFERRED BY HOUSEWIVES: At least noise out of every ten housewives (91 percent) in the United States who buy canned tuna usually purchase tuna packed in oil. Approximately seven percent buy tuna packed in brine and two percent are not aware which type they usually purchase.

A large majority (88 percent) of those housewives who served tuna indicated they had never tasted canned tuna in brine although it has been rather widely distributed in recent years. When asked "If the price were the same for canned tuna packed in oil or in brine, which one would you buy?" sixty-six percent indicated tuna in oil and seven percent indicated tuna in brine. Another twenty-seven percent were not sure which they would prefer. Even though the latter undecided group appears to be housewives usually buying canned tuna-in-oil, a substantial majority of housewives using canned tuna-in-oil desire that product exclusively.

This conclusion is based on opinions given in this survey and is not the result of actual product testing.

The preference for tuna in oil was highest in the West and South and diminished slightly in the Northeast and North Central regions.

These findings are based on a June 1956 scientific sample survey of 2,700 house-holds distributed throughout the United States. This study of type of pack preferences for canned tuna is one part of a broader study of household consumers' preferences for all canned fish and shellfish.

Final results of the survey, which is being financed by funds made available by the Saltonstall-Kennedy Act of 1954 to help the domestic fishing industry increase the demand for fishery products, are scheduled for publication the early part of next year. The U.S. Fish and Wildlife Service contracted with W.R. Simmons and Associates Research, Inc., of New York City to conduct the survey.

* * * * *

CANNED SARDINES PURCHASED TWO OR MORE CANS AT A TIME: Eight out of ten housewives who purchase canned sardines buy two or more cans at a time. More than 33 percent of the housewives usually purchase two cans. Another 20 percent indicate that they usually buy in units of three. These findings are based on a scientific sample survey of household consumers' preferences for canned fish and shellfish conducted in June 1956 among 2,700 households distributed throughout the United States.

The large number of purchases (81 percent) of more than one can of sardines at a time may be due partially to the pricing policy of retail stores and other factors. No attempt was made in this study to ascertain the effect of such factors on the purchasing pattern.

The tendency toward two-can purchases was almost consistently reported throughout the four geographic regions of the United States.

Table 1 - Percentage of Homemakers Purchasing Canned Sardines, by Number of
Cans Purchased at One Time and by Regions

Cans Purchased at One Time and by Regions					
	Regions				
	U.S.	North-	North	South	West
	Total	east	Central		
		(Percent).		
Number of Cans:				1	
One can	19.3	19.3	20.3	14.2	29.7
Two cans	33.4	40.1	31.8	30.2	33.0
Three cans	20.2	17.8	24.1	21.4	13.2
Four cans	12.4	11.7	10.4	14.9	11.5
Five or more cans	13.0	9.9	12.4	17.3	9.3
Don't know	1.7	1.2	1.0	2.0	3.3
Total	100.0	100.0	100.0	100.0	100.0
Weighted base (number of households					
which served canned sardines within					
the last 12 months)	(1,394)	(337)	(411)	(463)	(183)

Information on the purchasing habits of homemakers may serve as a basis for packaging cans of sardines in handy containers holding more than one can.

This study on sardine purchasing practices is one part of a broader study of household consumers' preferences for canned fish and shellfish. Final results of the survey, which is being financed by funds made available by the Saltonstall-Kennedy Act of 1954, are scheduled for publication the early part of next year. The U.S. Fish and Wildlife Service contracted with W.R. Simmons and Associates Research, Inc., of New York City to conduct the survey.

* * * * *

DEVEINED CANNED SHRIMP PREFERRED BY CONSUMERS: Shrimp which has been peeled and deveined before canning is preferred by a majority of the consumers who buy canned shrimp, according to a recent scientific sample survey of 2,700 households in the United States. Of the housewives that usually buy shrimp, 59 percent buy the peeled and deveined canned shrimp, while only 32 percent buy the regular peeled but not deveined pack. The remaining 9 percent either had no preference or did not know the type of canned shrimp they usually purchase.

Table 1 - Percentage of Consumer Purchases of Canned Shrimp by Area and Type of Pack					
		I	Regions		
	U.S. North North South West				
Number of Households	664	195	156	135	178
	(Percent)				
Households serving canned shrimp					
within last 12 months	100.0	100.0	100.0	100.0	100.0
Type of Pack Purchased:					
Cleaned (deveined)	59.4	68.3	64.5	49.3	53.4
Regular (not deveined)	31.6	24.3	28.4	34.3	39.8
No preference	5.0	6.8	2.6	8.2	2.8
Don't know	4.0	0.6	4.5	8.2	4.0

On a regional basis, the preference for deveined shrimp was most pronounced in the Northeast Area where it was preferred by more than 2 out of every 3 users of canned shrimp.

This study on consumers' preferences for canned shrimp is one part of a more general study on household consumers' preferences for canned fish and shellfish conducted in June 1956.

Final results of the survey, which is being financed by funds made available by the Saltonstall-Kennedy Act of 1954, are scheduled for publication the early part of next year. The U.S. Fish and Wildlife Service contracted with W.R. Simmons and Associates Research, Inc., of New York City to conduct the survey.



Cans--Shipments for Fishery Products, January-July 1956

Total shipments of metal cans during January-July amounted to 65,120 short tons of steel (based on the amount of steel consumed in the manufacture of cans) as compared with 55,195 tons in the same period of 1955. The increase in this year's shipments is due largely to the heavier pack of canned tuna as compared with the January-July 1955 period (when production was curtailed due to oversupply) and also the increase in

the pack of Maine sardines.

Note: Statistics cover all commercial and captive plants known to be producing metal cans. Reported in base boxes of steel consumed in the manufacture of cans, the data for fishery products are converted to tons of steel by using the factor: 23,0 base boxes of steel equal one short ton of steel,

Customs Simplification Act of 1956 Analyzed

The third customs simplification bill (H. R. 6040) was signed by the President on August 2. It will be known as the Customs Simplification Act of 1956 (Public Law 927, 84th Congress). A short analysis of the new law as it appeared in the August 13 Foreign Commerce Weekly follows:

The principal change embodied in this act is in the method of determining the value of the imported goods which are subject to ad valorem duties. In general, the primary basis for determining their dutiable valuation is to be the "export value" of goods. This is to replace the present system, which calls for ascertaining the "foreign value" of the product in question—the price at which it is sold in the country of origin—as well as the "export value," and for the duty to be calculated upon the higher of the two.

Under the amended form of the bill as finally enacted, however, the new system is not to apply to that small fraction of ad valorem imports on which the Treasury finds that the dutiable value would be reduced by 5 percent or more. Consequently, the new valuation provision does not come into effect for any imports untila final list of those exceptional articles is established.

The Bureau of Customs at Washington has started work on a preliminary list of those articles the dutiable value of which would be reduced by 5 percent or more. That list will be published in the Federal Register and in the Weekly Treasury Decisions. Interested businessmen then will have

60 days to suggest reasons for their belief that specified additions should be made to the preliminary list, which will be investigated by Treasury before the final list of exceptions is issued.

For goods subject to ad valorem duties other than those included on the final list of exceptions, the general change in the basis of valuation is to become effective on entries for consumption beginning the thirtieth day following the publication of that final list.

Other than dutiable valuation, the only change of direct commercial interest is with regard to conversion of a foreign currency into U. S. dollars for customs purposes. In general, the Secretary of the Treasury is authorized to use for the entire quarter of a year that rate of exchange which is first certified for that quarter by the Federal Reserve Bank of New York, unless the rate on any particular day varies from that certified rate by more than 5 percent.

Most of the act's other sections deal with obsolete provisions of customs law which the Treasury regarded desirable to have repealed.



Federal Aid Funds Apportioned to States for Sport Fish and Wildlife Restoration Work

State programs to restore and develop the sport fishery and wildlife resources in the 48 states will move at an accelerated pace during fiscal year 1957 with a foundation of \$21,062,000 in Federal aid funds, the Secretary of the Interior announced October 7, 1956. This is about \$2 million

more than in 1956.



On the basis of one dollar from the state for every three of Federal funds, \$28,083,000 will be available to state conservation departments for their restoration programs during fiscal year 1957.

The combined Federal Aid in Fish and Wildlife Restoration program is administered by the Fish and Wildlife Service under the terms of the Pittman-Robertson Act for wildlife and the Dingell-

Johnson Act for sport fishing. As prescribed in the two Acts, investments are made in restoration activities so that benefits will go to the hunters and anglers who seek recreation and food from the Nation's fields and streams.

This year the various state fish and game departments will receive \$16,236,000 for their wildlife restoration projects and \$4,826,000 for their sport fishery activities.

The amount available for sport fishery projects represents a drop of \$101,400 below the 1956 total of \$4,927,400.

The revenue for the Federal share of the sport-fish restoration program comes from the 10-percent excise tax on fishing rods, creels, reels, artificial lures, baits, and flies, paid by the manufacturers of these products. Collections from this source during the year ended June 30, 1956, amounted to \$5,149,918. From this total is taken the annual apportionments of \$75,000 to Alaska, \$25,000 to Hawaii, \$10,000 each to Puerto Rico and the Virgin Islands, and the cost of administering the Act by the U. S. Fish and Wildlife Service.



Federal Purchases of Fishery Products

PORTIONS INCLUDED IN FRESH OR FROZEN FISH FEDERAL SPECIFICATION: The Army Quartermaster Corps has announced a revision, effective October 1, 1956, of Federal Specification PP-F-38ld "Fish; Fresh (Chilled) and Frozen," to include formed fish portions as an item for purchase by the Armed Forces.

Fishing and Wildlife,	Sport Fishing	Wildlife
Alabama	\$ 66,666,23	\$287,788,29
Arizona	84,628.46	361,637.73
Arkansas	91,850.01	277,294.93
California	241,300.00	777,565.54
Colorado	113,759:81	485,842.9
Connecticut	48,260.00	81,180.0
Delaware	48,260.00	81,180.0
Florida	94,200.28	227,370.9
Georgia	101,101.06	401,083.1
daho	84,885.44	330,805.4
llinois	170,857.14	446,687.6
Indiana	118,403.23	355,643.5
lowa	96,156.64	351,096.2
Kansas	79,415,49	326,022.5
Kentucky	86,116.99	252,880.4
Louisiana	62,360.98	268,480.0
Maine	52,533.56	189,789.2
Maryland	48,260.00	108,447.8
Massachusetts	48,260.00	90,494.3
Michigan	241,300.00	811,800,0
Minnesota	241,300.00	507,335.8
Mississippi	52,494.07	239,533.4
Missouri	131,570.42	369,988.9
Montana	114,342.85	494,980.5
Nebraska	78,841.23	308,928.9
Nevada	68,888.10	315,453.7
New Hampshire	48,260.00	81,180.0
New Jersey	48,260.00	121,636.0
New Mexico	81,346.07	371,304.3
New York	157,763.52	670,174.9
North Carolina	82,053.76	339,320.3
North Dakota	50,859.24	248,832.2
Ohio	162,996.28	475,076.2
Oklahoma	103,394.13	287,483.1
Oregon	103,599.65	410,673.5
Pennsylvania	141,976.16	638,190.8
Rhode Island	48,260.00	81,180.0
South Carolina	69,354.44	174,306.7
South Dakota	63,949.04	303,717.9
Tennessee	140,219.71	355,843.8
rexas	220,773.17	811,800.0
Utah	73,599.13	322,936.6
Vermont	48,260.00	81,180.00
Virginia	81,849.34	325,287.4
Washington	97,344.46	349,256.8
West Virginia	48,260.00	213,517.9
Wisconsin	207,390.99	486,128.61
Wyoming	80,218.92	337,660.1

The revision may well result in an expansion of production by the domestic fish fillet block industry to supply the $4\frac{3}{4}$ -ounce (3 inches by $3\frac{3}{4}$ inch) portions now allowed for purchase. In the announcement of the specification revision the Quartermaster Corps stated that on any contracts awarded for fish portions, the contractor agrees that there will be delivered only such unmanufactured articles, materials and supplies as have been mined or produced in the United States, and only such manufactured supplies as have been manufactured in the United States substantially all from supplies mined, produced or manufactured, as the case may be, in the United States.

Though the specifications require the size portions indicated for use by the Armed Forces, the domestic fish block producer can supply sizes suited to other specific needs. For example, school-lunch (Type A) portions usually contain two ounces of cooked fish protein. Institutional purchasers of fish portions usually specify that the product be four ounces in weight.

The following is a quotation from the notice of revision:

"When F.S. PP-F-38ld, "Fish; Fresh (Chilled) and Frozen," 3 Sept 54, is cited in this contract, the following changes to the specification will apply:

(1) Page 1, paragraph 1.3 add the following: Form VI - Portions."

"(2) Page 4. Add the following paragraph: "3.3.2.6. Form VI. - Portions shall be prepared from fresh skinless fish fillets handled in the applicable manner specified in 3.3.1 and 3.3.2. The skinless fillets shall be formed into: (a) portions measuring 3 by $3\frac{3}{4}$ by $\frac{3}{4}$ inches (approximately $4\frac{3}{4}$ ounces) or (b) into portioned blocks measuring

9 by $3\frac{3}{4}$ by $\frac{3}{4}$ inches and scored on the top and bottom surfaces into 3 equal portions of the length (every 3 inches), or other sizes or portions or portioned blocks as specified. In the frozen portioned block, the portions shall remain attached at the location of the score by the remaining attached strip (about $\frac{1}{2}$ inch thick) of frozen fish so that the portions can be easily separated by bending the blocks. The portions shall be handled and processed in such a manner that they will effect a solid piece of fish flesh, and the pieces of fish comprising the portions will not fall apart or disintegrate when cut, thawed, or cooked."

(3) Page 9. Add the following paragraph: "7.2.4.3. Form VI, Portions. Portions of portioned blocks shall be wrapped in approximately 1-,5-, or 10-pound units. The product shall be completely wrapped in a prefabricated bag. When

more than 1 portion or portioned block is inclosed in the bag, the layers shall be separated by a wax paper insert. The wrapper shall be processed by vacuum, pressure, or heat, or a combination of these conditions so that the wrapper forms a tight, close fit conforming to the surface of the product. The bag shall be string-tied, heat-sealed, secured with pressure-sensitive tape, or closed with suitable metal clips. The bag shall be made of one of the following materials: (a) Polyethylene, not less than .0015 inch thick and having an area yield of not more than 21,500 square inches per pound, (b) A film formed by copolymerizing vinylidene chloride and vinyl chloride. The film shall be not less than .0015 inch thick. For domestic shipment, the packaged product shall be packed in accordance with 5.2. For overseas shipment, not more than 60 pounds of the product shall be packed in accordance with 7.2.5.2."

* * * * *

FRESH AND FROZEN FISHERY PRODUCTS PURCHASED BY THE DEPART-MENT OF DEFENSE, AUGUST 1956: The Army Quartermaster Corps in August

| Purchases of Fresh and Frozen Fishery Products by Department of Defense (August and the First Eight Months of 1956 With Comparisons | QUANTITY | VALUE | August | Jan. Aug. | August | Jan. Aug. | 1956 | 1955 | 1956 | 1955 | 1956 | 1955 | 1956 | 1955 | 1956 | 1955 | 1956 | 1955 | 1956 | 1955 | 1956 | 1955 | 1956 | 1955 | 1956 | 1955 | 1956 | 1955 | 1956 | 1955 | 1956 | 1955 | 1956 | 1955 | 1956 | 1955 | 1956 | 1955 | 1956 | 1955 | 1956 | 1955 | 1956 | 1955 | 1956 | 1955 | 1956 | 1955 | 1956 | 1955 | 1956 | 1955 | 1956 | 1955 | 1956 | 1955 | 1956 | 1955 | 1956 | 1955 | 1956 | 1955 | 1956 | 1955 | 1956 | 1955 | 1956 | 1955 | 1956 | 1955 | 1956 | 1955 | 1956 | 1955 | 1956 | 1955 | 1956 | 1955 | 1956 | 1955 | 1956 | 1955 | 1956 | 1955 | 1956 | 1955 | 1956 | 1955 | 1956 | 1955 | 1956 | 1955 | 1956 | 1955 | 1956 | 1955 | 1956 | 1955 | 1956 | 1955 | 1956 | 1955 | 1956 | 1955 | 1956 | 1955 | 1956 | 1955 | 1956 | 1955 | 1956 | 1955 | 1956 | 1955 | 1956 | 1955 | 1956 | 1955 | 1956 | 1955 | 1956 | 1955 | 1956 | 1955 | 1956 | 1955 | 1956 | 1955 | 1956 | 1955 | 1956 | 1955 | 1956 | 1955 | 1956 | 1955 | 1956 | 1955 | 1956 | 1955 | 1956 | 1955 | 1956 | 1955 | 1956 | 1955 | 1956 | 1955 | 1956 | 1955 | 1956 | 1955 | 1956 | 1955 | 1956 | 1955 | 1956 | 1955 | 1956 | 1955 | 1956 | 1955 | 1956 | 1955 | 1956 | 1955 | 1956 | 1955 | 1956 | 1955 | 1956 | 1955 | 1956 | 1955 | 1956 | 1955 | 1956 | 1955 | 1956 | 1955 | 1956 | 1955 | 1956 | 1955 | 1956 | 1955 | 1956 | 1955 | 1956 | 1955 | 1956 | 1955 | 1956 | 1955 | 1956 | 1955 | 1956 | 1956 | 1955 | 1956 | 1956 | 1956 | 1956 | 1956 | 1956 | 1956 | 1956 | 1956 | 1956 | 1956 | 1956 | 1956 | 1956 | 1956 | 1956 | 1956 | 1956 | 1956 | 1956 | 1956 | 1956 | 1956 | 1956 | 1956 | 1956 | 1956 | 1956 | 1956 | 1956 | 1956 | 1956 | 1956 | 1956 | 1956 | 1956 | 1956 | 1956 | 1956 | 1956 | 1956 | 1956 | 1956 | 1956 | 1956 | 1956 | 1956 | 1956 | 1956 | 1956 | 1956 | 1956 | 1956 | 1956 | 1956 | 1956 | 1956 | 1956 | 1956 | 1956 | 1956 | 1956 | 1956 | 1956 | 1956 | 1956 | 1956 | 1956 | 1956 | 1956 | 1956 | 1

1956 purchased 2,860,000 pounds (value \$1,403,000) of fresh and frozen fishery products for the use of U. S. Army, Navy, Marine Corps, and Air Force. This was 10.2 percent less in quantity and 15.1 percent less in value than the purchases in July 1956

and 23.2 percent more in quantity and 36.3 more in value than purchases in August 1955.

Purchases of fresh and frozen fishery products during the first eight months of 1956 totaled 18,275,000 pounds valued at \$9,108,000--4.7 percent more in quantity and 21.9 percent more in value than purchases for the similar period in 1955.

Prices paid for these fishery products by the Department of Defense in August averaged 49.1 cents a pound as compared with 50.7 cents the previous months and 44.3 cents a pound in August 1955.

In addition to the purchases of fresh and frozen fishery products reported, the Armed Forces make some local purchases which are not included above. Therefore, actual purchases are higher than indicated, but is not possible to obtain data on the local purchases by military installations throughout the country.



Fish and Wildlife Motif on United States Postage Stamps

The third and last (king salmon) of three stamps issued this year to emphasize the importance of wildlife conservation in America was released at Seattle, Wash., on November 9, 1956.



The king salmon, which is the subject of the third stamp, offers an outstanding example of the conservation work being carried on by Federal and state governments. King salmon continue to be very valuable commercial and sport fish in the United States and Alaska and they have been aided in their spawning migration upstream by fish ladders and elevators, and by elimination of logiams and high waterfalls.

The stamp is 0.84 by 1.44 inches in dimension, arranged horizontally with a single outline frame, printed by the rotary process, electriceye perforated, and issued in sheets of 50. The color of the stamp is green. The printing of 120,000,000 3-cent king salmon stamps was authorized.

The design depicts king salmon on their annual migration upstream to the spawning ground.

Fish and Wildlife Service

RESEARCH HELPS BRING TOP-QUALITY FISH CLOSER TO CONSUMER'S TABLE: Through research the U.S. Fish and Wildlife Service is pointing up new market goals for the fishing industry, and through technology it is showing ways to move more efficiently ocean-fresh fish to the consumer's table.

Among the possible marketing goals which Service efforts are bringing into focus for the fishing industry are such things as:

A total of 182,000 eating places which do not now serve fish or shellfish;

"Inland U. S. A." where the per capita fish consumption is well below the seaboard average;

The more than 10,000 frozen-food locker plants in the country, many of which do not have fish among the products available for locker customers;

A large but yet indefinite field of in-plant eating places (such as cafeterias in big assembly plants) which is now being studied;

The field of public institutions which is now being studied to determine which ones offer good markets for fish, and the school-lunch program which the Fish and Wildlife Service has aided for years to the mutual betterment of the school child and the industry;

And the largest field of all, the millions of American housewives who daily plan the meals for the family—a field rich in possibilities for greater sales of fish and fish products and a field which is now being given serious and scientific study by the Fish and Wildlife Service.

In technological studies the Fish and Wildlife Service has gone far in showing the industry how fish can be delivered virtually only "hours old" to the customer.

These studies are practically following the fish from the water to the table--on ship-board, in ship storage, in transit, in land storage, and right up to sales display.

The initial step in getting high-quality fish or fish products to the customer begins the minute the fish are taken out of the water, Fish and Wildlife Service technicians say.

Important questions which have been studied include freezing methods, ability of various species of fish to retain flavor and freshness during periods of refrigeration, the effect of breading upon freezing, the use of protective coverings to insure freshness in frozen fish, the development of "quality standards," and the search now in progress for the "flavor component," that intangible thing which makes fish taste like fish instead of something else.

Success in these programs, figuratively, brings the consumer--regardless of where he is--closer to the water's edge and make it possible to supply him with a product which meets the test of comparison with a fish just taken from its native waters.

One phase of the broad research program is to determine how the merchandising methods of the Nation's 413,000 retail fish products markets measure up to the consumer preference, and there are many facets of both merchandising and preference.

One approach which the Service has taken relates to packaging and portions. If the study of fish portions served in restaurants and other public eating places leads to packaging fresh or frozen fish on an acceptable portion basis, those of the 182,000 restaurants which have deferred serving fish because of handling difficulties might well become a steady market for portion-packaged fillets and other fish products.

To get the data on household consumers' food tastes and buying habits, house-wives are being interviewed to determine the factors influencing the use or nonuse of the various species and kinds of canned fish and shellfish.

Studies are also being made of the size of package the housewife wants, her preference on species, and the availability of that species at the time she wants it.

Surveys on easy-to-prepare fish products such as breaded fish sticks or breaded shrimp have shown that the young housewife is more readily attracted to that type of a commodity; that the city dweller is a better customer than his rural cousin; that there is a relationship between the sales of these items and the salary brackets of the citizens, with low-salary families buying them lightly; and furthermore the surveys show that the majority of folks who use these products once become steady customers afterward.

But experience has shown that the customer insists upon uniformly good quality and that if the supply does not meet this particular preference sales are not made. To help the industry meet this quality demand by customers and to help the customers get the product they desire, the Fish and Wildlife Service, through technological studies, has been a leading force in the establishment of "quality standards."

The most recent step in that direction is the establishment of a program for the development of voluntary Federal standards for grades. Although the first standards, those for fish sticks, have been available for use only since August 21, 1956, several fish products companies have adopted these voluntary Federal standards in reply to the consumers' refusal to purchase products below satisfactory quality levels.

Next in the order of expected issuance will be standards for fish blocks (the raw material from which fish sticks are made), for such portion-control-type products as breaded fish squares and breaded shrimp; and frozen fillets of cod, haddock, and ocean perch. These standards will serve as yardsticks for the evaluation of quality for those products offered to the consumer.

In other words the Fish and Wildlife Service is studying or has studied most of the important steps between the fishermen's net and the consumer's table. It is blazing out a trail, so to speak, by setting up techniques whereby the industry can deliver to the consumer the freshest and most flavorful fish product. It is helping the consumer get the product he wants by finding out what he wants and passing that information along to the industry. Finally, it is determining guidelines of quality through which the industry and the consumer share a common confidence.



"Fish Parade" Promotion by Industry Backed by Interior Department

The "Fish Parade," which is the fishing industry's designation of its 1956 National Fish Week, October 29 to November 2, had the support of the U. S. Department of the Interior. Among the many features of the "Fish Parade" program was

the "Shrimp Fiesta" which began October 15

and ended November 3.



The goal of the fishing industry was to develop an increased fall selling season when inventories are normally at their peak. Historically, the big selling season for fishery products occurs during Lent each year.

Because fish is one of the most valuable of protein foods, the All-Industry Fish Week Committee decided that a fall drive to increase the use of fish and shellfish would be beneficial to the industry and the consumer alike.

The 1956 drive for a big fall selling season was described by industry spokesmen as the most ambitious coordinated sales effort ever attempted by the fishing industry in this country. Not only were practically all segments of the American fisheries engaged in the drive, but wholesalers, distributors, and retailers throughout the Nation joined in the effort to make the fall sales campaign the most successful in history. Many State and local officials also join in the drive.

In pledging the support of the Department of the Interior to the industry's sales effort, Fish and Wildlife Service Director John Farley said:

"The fishing industry is important to the national health, safety, and interest. It renders valuable service to the people of this country by providing a large proportion of the Nation's food supply, as well as large quantities of meal for the feeding of livestock and of fish oils and fish liver oils for food, medical, and industrial uses.

"During 1955, 4.6 billion pounds of fish were produced in the United States and Alaska. Of this approximately 56 percent was used as food and 44 percent was used in the manufacture of byproducts or as bait. From these data it can be seen that fishery products are an important source of the Nation's supply of animal protein.

"The Department of the Interior, through the Fish and Wildlife Service, has a direct responsibility to the fishing industry and to the people of this country. Therefore, not only do I gladly pledge support to this magnificent effort but I also say very proudly that the Department of the Interior does not confine its efforts to one week in the year but that it works diligently in this field, through research, education, market promotion, and otherwise every week in the year. And I do not hesitate to add that we will endeavor to do even more for the fishing industry and the consumers in the future than we have done in the past."



Florida

AIRBOAT GILL-NETTING: Airboat gill-netting in Lake Okeechobee is a new twist in an old fishery. An enterprising mullet fisherman at Okeechobee reasoned that rowing around a school of mullet was too slow and difficult and decided to speed up the operation.

To expedite the plan, a three-foot extension was built on the stern of an airboat hull to house a 220-yard gill net (see fig. 1). The airboat, powered by a 100-

horsepower Lycoming aircraft engine, is capable of speeds in excess of 40 miles an hour. The aluminum hull is 15 feet long with a 5-foot beam. The steering mechanism consists of a pair of air rudders behind the propeller and is operated by the driver with a connecting steering stick. The driver steers the boat while sitting in an elevated bucket seat. This is particularly advantageous since schools of fish are more easily seen from this height.

The net is customarily set at full speed. When a school of fish is located, the captain maneuvers into a desired position and a two-pound net anchor

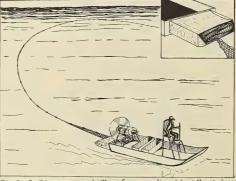


Fig. 1 - Striking run-around gill net from speeding airboat (Inset shows airboat extension with net being set.)

is cast overboard. The net anchor is attached to the lead and cork lines of the gill net. The drag of the anchor pulls the net from the compartment as the boat circles the school. After the boat completes the circle, the fishermen retrieve the net, stowing it in the compartment. In retrieving the net the enclosure becomes smaller, forcing the fish to strike the wall of mesh, thus becoming entangled. The fish are removed by hand and placed in boxes aft of the driver's seat. This operation takes from 30 minutes to one hour, depending on the amount of fish caught.

The net is a typical mullet runaround gill net, 200 yards long, 24 meshes deep, $4\frac{1}{4}$ -inch stretched mesh, and No. 6 nylon twine. The nylon material takes a minimum of storage space and requires little maintenance.





Fig. 2 - Airboat with gill net adaption mounted on trailer for transporting to various fishing grounds.

Fig. 3 - Airboat used in run-around gill-net operation showing extension on stern for net storage,

Other applications of this unique fishing method have not been explored.

--Billy F. Greer & Donald T. Montgomery, Fishery Marketing Specialists, Statistical Section, Branch of Commercial Fisheries, U. S. Fish and Wildlife Service, Coral Gables, Fla.



Fur-Seal Skins

PRICES CLIMB AT GOVERNMENT FALL AUCTION: An increase of 6.3 percent in prices of United States fur-seal skins marked the semiannual auction of



Fur buyers examining fur seal skins prior to auction.

Government-owned furs at St. Louis on October 5, the Secretary of the Interior announced October 14, 1956.

A total of 26,890 skins, products of the sealing industry administered by the Department of the Interior's Fish and Wildlife Service on the Pribilof Islands, brought \$2,714,852. This compares with 27,017 skins sold for \$2,519,994 at the April 17 sale. The grand average for all skins sold for the account of the United States Government was \$100.96; at the April sale it was \$93.27.

The grand average at the October 1955 sale was \$94.14.

The sale was well attended by United States, Canadian, and European buyers who commented favorably on the quality of the skins offered. Bidding was spirited because few skins are in the hands of dealers at the present time.

Of the Alaska skins, 17,555 were dyed "Matara" (brown), 419 were "Safari" brown (a lighter brown), and 8,916 were blacks. The Matara skins brought an average of \$97.26, an increase of 5.5 percent over the April auction. The Safari skins sold for an average of \$76.81, an increase of 18.3 percent. The black skins averaged \$109.38, an upward change of 7.25 percent over the April price of \$103.18.

In addition to the United States skins, 3,699 Cape of Good Hope fur-seal skins were sold for the account of the Government of the Union of South Africa at an average of \$34.33, an increase of 20.1 percent from the last sale. A total of 414 Uruguay fur-seal skins were sold for the Government of Uruguay at an average of \$48.73, a slight increase over the April price of \$45.12.

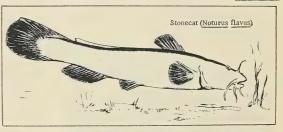
Prior to the auction an announcement was made that the Pribilof Island fur seal take for 1956 would amount to approximately 122,000 skins.

The next auction is scheduled tentatively for April 5, 1957, at which time the normal quota of United States skins to be offered for sale will be increased by about 3,000.

Great Lakes Fishery Investigations

M/V "CISCO TRIES TO LOCATE SUMMER GROUNDS OF WALLEYE IN LAKE HURON (Cruise 5): An attempt to locate summer grounds of the walleye (Stizosted-

eon vitreum vitreum) outside of Saginaw Bay proper was the principal mission of Cruise 5 (August 21-September 2, 1956) of the M/V Cisco, the research vessel of the Service's Great Lakes Fishery Investigations. This cruise, like Cruise 3, was confined to Saginaw Bay and immediately adjacent waters in Lake Huron.



Nylon gill nets (mesh sizes $2\frac{1}{4}$, $2\frac{1}{2}$, $2\frac{2}{4}$, 3, and 4 inches) were set off Harbor Beach and Grindstone City in 7 to 10 fathoms of water. It is believed that some of the walleye present in the lower end of the Bay during spawning season spread into Lake Huron proper at other seasons. Eight walleye were taken off Harbor Beach and 2 off Grindstone City. Several white suckers (Catostomus commersoni), longnose suckers (Catostomus catostomus), and yellow perch (Perca flavescens) were were caught in both nets. In addition, the nets off Grindstone City took 10 stonecat (Noturus flavus).

Nets of $2\frac{1}{2}$ -inch mesh were set obliquely from surface to bottom in 26 fathoms and 13 fathoms off East Tawas. A set of $3\frac{1}{2}$ -inch mesh gill net was also made at 13 fathoms. The $3\frac{1}{2}$ -inch net took 20 white suckers, all but one at or just above the bottom. Sixteen white suckers, 2 longnose suckers, and 4 yellow perch were caught in the shallow $2\frac{1}{2}$ -inch set, practically all near the bottom. A lone perch at midlevel represented the total catch in the deep set.

A bull net (300 feet long, 120 meshes deep, $2\frac{1}{2}$ -inch mesh) was set over a 34-fathom bottom with the float line just at the bottom of the thermocline (60 feet). Two lake herring (<u>Leucichthys artedi</u>), 6 longjaws (<u>Leucichthys alpenae</u>), and 2 smelt (Osmerus mordax) were caught in this net.

Much difficulty was encountered in trawling operations this cruise. Trawls were repeatedly damaged and two of them were badly torn. In addition, on several occasions the nets became heavily loaded with mud. In the few successful hauls completed, only small numbers of perch, smelt, and forage fish were taken.

Seine collections were made in two locations along the northwest shore and two areas along the southeast shore of Saginaw Bay. It was hoped that walleye fingerlings could be located, but none were found. However, fingerlings of perch, largemouth black bass (Micropterus salmoides), smallmouth black bass (Micropterus dolomieu), black crappies (Pomoxis nigro-maculatus), and bluegill (Lepomis macrochirus) were taken.

Hydrographic transects were run from Bay City to East Tawas, East Tawas to Harbor Beach, East Tawas to Oak Point, and Hat Point to Au Sable Point. Surface water temperatures were nearly constant over the area covered, ranging mostly from 18 to 20°C. (64.4-68°F). A low of 16.8°C. (62.2°F.) was recorded in Lake Huron, and a high of 23.2°C. (73.8°F.) was recorded near the mouth of the Saginaw River in Saginaw Bay. The epilimnion is thick in deeper water, ranging from 60 to 90 feet between upper and lower limits.

An all-night study of the vertical migration of <u>Mysis relicta</u> was made in 55 fathoms in mid-southern Lake Huron. A photometer was used to study light conditions from the time the organisms migrated up in the evening until they moved down in the morning.

* * * * *

<u>LAKE HURON INVESTIGATIONS CONTINUED BY M/V "CISCO" (Cruise 6):</u> Saginaw Bay and part of southern Lake Huron was the area where the Service's research vessel <u>Cisco</u> operated during Cruise 6 (September 11-24, 1956).

The usual oblique sets of gill nets were made off East Tawas in 13 and 26 fathoms, but the deeper set was of no value since the gang was dragged 5 miles by strong currents before it was recovered. A single bloater (<u>Leucichthys hoyi</u>) represented the total catch in the shallow gang, which was lifted before the current had moved it.

Two bull nets (each 300 feet long and 120 meshes deep) were set in 33 fathoms off East Tawas, one on the bottom and the other with its float line in the thermocline and its lead line just below the thermocline. The bottom net contained 117 bloaters, 125 Leucichthys alpenae, 4 L. reighardi, and 57 smelt. The midwater set caught 2 bloaters, 36 L. alpenae, 1 L. reighardi, 5 smelt, and 2 alewives. Thus it appears that L. alpenae move up to midlevels more than do L. hoyi.

Since several days were lost to weather, trawling was done only in one area. Drags in 6 to 8 fathoms off East Tawas produced mostly perch (<u>Perca flavescens</u>) and small alewives (<u>Pomolobus pseudoharengus</u>).

Nylon gill nets containing 300 feet each of 2-, $2\frac{1}{4}$ -, $2\frac{1}{2}$ -, $2\frac{3}{4}$ -, 3-, and 4-inch mesh were set in 25 fathoms off Harbor Beach and in 50 fathoms in midlake between Harbor Beach and Goderich. The shallow set took 135 bloaters, 22 L. reighardi, and a few each of L. alpenae, L. artedi, and smelt; the 50-fathom set 65 L. alpenae, 65 L. kiyi, 46 L. hoyi, 16 L. reighardi, and several L. zenithicus and L. artedi.

Hydrographic transects were run from Bay City to East Tawas, East Tawas to Harbor Beach, Harbor Beach to Goderich, East Tawas to Oak Point, and Hat Point to Au Sable Point. Surface-water temperatures dropped rapidly under the influence of cold winds toward the end of the cruise. The highest temperature recorded was 19.2 °C. (66.6 °F.) and the lowest 11.4 °C. (52.5 °F.).

Market for Frozen Foods Increases 50 Percent in Year

Prepared frozen foods now constitute more than a third of all frozen foods marketed in the United States, after a remarkable increase of nearly 50 percent in 1955. Manufacturers of these convenience foods looked for a further substantial increase in 1956-perhaps 35 percent over the 1955 total.

Agricultural products have gained most in this relatively new field of merchandising, but the fishing industry has also chalked up an impressive record. Fish sticks sprang into national prominence in 1954 in the path of breaded shrimp. Other prepared fish specialty items soon appeared in grocers' display cases.

Housewives welcome the freedom from unpleasant odors and waste and the certainty of well-prepared meals with a minimum of effort. So they are buying more and more of the many attractively-prepared frozen foods.

What is behind all this revolutionary change in marketing? The answer is advertising and promotion. Tempting color spreads in magazines arrest the attention and make fishery products inviting to young and old. Users of television, radio, and newspaper advertising continually keep their products' merits before consumers.

Those who pack these new prepared frozen food specialties have assumed a heavy responsibility to the consuming public. Most packers show a keen sense of awareness to the need for adherance to highest quality levels to insure repeat business. Government-sponsored voluntary standards of quality for fish sticks which are now in effect promise to exert a strong stabilizing influence on sales of this product.

North Atlantic Fisheries Exploration and Gear Research

DEEP-WATER TRAWLING FOR OCEAN PERCH BY M/V DELAWARE (Cruise 26): Deep-water exploratory trawling for ocean perch along the edge of the continent-



M/V Delaware (Cruise 26) September 25-October 6, 1956.

al shelf, south of Georges Bank, by the Service's exploratory fishing vessel Delaware revealed no commercial concentrations of trawl fish during this 11-day trip. Previous operations by the Delaware during deep-water lobster exploration in this same area gave indications of possible commercial concentrations of ocean perch (Sebastes marinus). This cruise was undertaken in order to more thoroughly map the bottom and commercial fishing potential of this deep-water area during the early fall months.

A total of 22 otter-trawl

tows and 14 dredge stations were made despite rough weather resulting from the aftermath of hurricane Flossy. No significant catches of commercial species were made. Operations were conducted with a trawl net on the southern edge of Georges Bank from 100 to 350 fathoms of water. One net and a set of ground cables were lost after hanging up on an unknown bottom obstruction.

A total of 14 dredge stations produced indications of ocean quahogs (<u>Artica islandica</u>) and sea scallops (<u>Pecten grandis</u>). This minor phase of the operation was conducted as a preliminary exploratory operation incidental to the major objective of the cruise. About 1,500 pounds of lobsters were caught incidental to the fish-trawling operation. About 150 pounds were landed at the Service's East Boston Fishery Technological Laboratory for freezing tests.

Systematic offshore tuna reconnaissance will be conducted by the <u>Delaware</u> during Cruise 27. The vessel was scheduled to depart from East Boston on October 16, 1956. Additional information on the fall migrations of bluefin school tuna found during the summer in the New England area was the primary objective of the three-week cruise. Plans called for exploration in the oceanic area south of Georges to the center of the Gulf Stream.

The <u>Delaware</u> was to make observations both visually and electronically with "fish finder" equipment for detection of subsurface schools. Trolling gear was to be used if any surface pelagic fish schools were sighted.

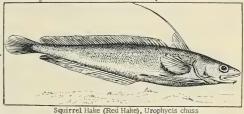
This is the first in a series of exploratory fishing surveys to the northwest central area of the North Atlantic and the operation is a continuation of the Service's program to evaluate both the inshore and possible offshore potential of New England's tuna resources.



North Atlantic Fisheries Investigations

TWO-YEAR-OLDS PREDOMINATE IN RED HAKE POPULATION (M/V T-79, Cruise 6): Two-year-olds are now the predominant members of the red hake population in the local fishing areas worked by boats from Pt. Judith, R. I. Some

three-year-old fish were taken in 40 fathoms, very few were seen elsewhere. This shift from three-year-old-fish which were the predominant members of the catch at the beginning of the summer indicates a very high mortality rate at this age, especially in view of the fact that there is no evidence at this time that the older fish abandon the grounds and move out in any numbers. These



were the findings of Cruise 6 (September 12-15, 1956) of the Service's research vessel T-79.

Red hake has a marked periodicity in feeding rhythm during the day. They were found to have consistantly full stomachs in midmorning, with little evidence of any digestive action. In early afternoon, the stomachs were still full but the contents showed considerable evidence of digestive action. By late afternoon, the stomachs had been almost entirely emptied and the intestines were full of macerated material.

The food in red hake stomachs will be analyzed for species present and the data compared with the material collected by the bottom plankton sampler and the bottom grab.

Surface water temperatures were in the lower sixties (F.) at all stations. Bottom temperatures were in the lower forties (F.) A fairly well developed thermocline was present at all stations.

The purpose of the cruise was: (1) to sample species composition of fishes on various grounds; (2) to determine diurnal periodicity of feeding habits of the commoner species of fish; (3) to determine the abundance of and the species of the various common bottom organisms; and (4) to tag skates and some other species of fish if they are sufficiently abundant on the grounds fished.

Five fishing stations and eight hydrographic stations were occupied. The fishing stations were local fishing areas for boats from Pt. Judith with the exception of the last, a relatively deep-water station. A series of BT casts was made from Block Island Sound out to 150 fathoms.

* * * * *

UNDERWATER TELEVISION EQUIPMENT TESTED UNDER TOW BY VESSEL "T-79" (Cruise 7 and 9): The Service's research vessel T-79 on the afternoon of October 5, 1956 (Cruise 7) tested underwater television equipment under tow in Falmouth Harbor. The television camera with attached stabilizing fins and 43-pound depressor was towed at speeds up to $2\frac{1}{2}$ knots. The equipment performed well under tow. A 35° to 40° cable angle was obtained at approximately $2\frac{1}{2}$ knots.

Another cruise (No. 9) on the afternoon of October 16 was made to test underwater television equipment off Naushon Island. Operations consisted of bottom viewing and towing while under way. Bottom organisms were clearly observed at depths of 36 feet while the vessel was at anchor. Camera launching and handling techniques were improved during this cruise. The camera with appropriate stabilizing devices was towed at slow speeds. Plans are now being developed to view commercial trawling operations with techniques devised on this cruise.



North Atlantic Herring Research

HERRING EXPLORATION ALONG MAINE COAST AND BAY OF FUNDY BY M/V "METACOMET" (Cruise 6): Generally schools of herring brit were found to be present in appreciable quantities along most of the Coast of Maine from Portland to Eastport. The largest concentrations were in the Passamaquoddy Bay-Grand Manan Island and Casco Bay areas. Small sample lots were taken, where practicable, of 0 year-class "brit" or larger herring that could become available as sardines during the fall months by the M/V Metacomet, a Fish and Wildlife Service chartered exploratory fishing vessel. During Cruise 6 (August 18-30, 1956), the vessel was scouting most of the major bays, sounds, and rivers along the Coast of Maine from Casco Bay to Eastport and the Canadian waters of the Bay of Fundy around Grand Manan Island, the Wolves Islands, the northwestern shore of Nova Scotia from Digby Gut to Petite Passage, and St. Marys Bay.

The samples were obtained by making short tows with a British Columbia-type midwater trawl with a small mesh liner in the cod end. The tows were made to determine the species of fish located by the depth-sounder, the size of herring if present, and the percentage of herring infected by various disease and parasitic organisms characteristic of the species. The latter determination is being carried on at the Boothbay Harbor biological laboratory.

In the general area of Passamaquoddy Bay good showings of herring were recorded by the depth-sounder and sampled in the St. Croix River, St. Andrews Bay, Western Passage, Friar Roads, the eastern shore of Deer Island, Grand Manan Channel, and between East Quoddy Head and The Wolves. Very few fish were

located by the depth-sounder in Cobscook Bay or South Bay. There was only one fair-size school of fish noted on the depth-sounder between the Wolves and Digby, Nova Scotia. Scattered surface schools were recorded off Digby and from Digby southwest along the shore of Digby Neck to Petite Passage. No fish were recorded in Lower St. Marys Bay or between Briar Island and Grand Manan Island.

A few scattered schools were located by the depth sounder near Cutler Bay and in Machias, Englishmans, Chandlers, Western, Pleasant, and Narraguagus Bays. Fair showings were recorded on the sounder in Frenchmans Bay, where several samples were taken.

Only a few very scattered small schools were found in Penobscot Bay and Blue Hill Bay, except for one good school of brit recorded and sampled in the Union River. Very few fish were recorded in the Muscongus Bay area or Johns Bay. Good showings of fish were recorded in the Damariscotta River near East Boothbay and Plummers Point, and scattered fish were observed between this river and the Sheepscot. Samples were taken near Ebenecock Bay and Barters Island in the Sheepscot River. Scattered schools were recorded off Seguin Island, Cape Small, and in the outer waters of Casco Bay.

In the Casco Bay area very good concentrations of herring were recorded and sampled near the mouth of the New Meadows River and in Hussey Sound. Other large schools, quite apparently herring brit, were recorded in Portland Channel, Broad Bay, and Middle Bay.

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MIDWATER TRAWL GEAR TESTED BY M/V "METACOMET" IN GULF OF MAINE (Cruise 7): In order to gain more information on the possibility of catching herring and herringlike fish in commercial quantities in Gulf of Maine waters, the M/V Metacomet, a Fish and Wildlife Service chartered exploratory fishing vessel, tested midwater trawl gear during Cruise 7 (September 5-15). The trawl used was the first type designed by W. A. Barraclough and W. W. Johnson at the Pacific Biological Station at Nanaimo, British Columbia, Canada, and used successfully to catch herring in British Columbia waters during winter months.

Fish were sounded and tows made at the Isles of Shoals, Boone Island, Ipswich Bay, and on the north, east, and south sides of Cape Cod. Tows were made through large solid schools of fish on several occasions, the largest of these being schools of bluebacks (Pomolobus aestivalis)—a species closely related to the herring—in Ipswich Bay. All tows were made during the night.

The largest catches were of 2 to 3 bushels of bluebacks approximately $8\frac{1}{4}$ inches, standard length. It was noted as the net was being hauled aboard that a large portion of these small catches were in the body of the net rather than in the cod end. This indicates that these fish were probably swimming along inside the net.

Since the net was towed directly through waters where large solid schools were located with the depth sounder without catching any appreciable quantities, it appears that the fish can detect the approaching net by sight, sound, or water pressure and are able to avoid it. Once the fish become frightened by the net they are likely able to swim as fast or faster than the net (towing speed spproximately 3 knots) and escape capture.

Water temperatures are relatively high during this season and the fish are near their peak of activity. It is significant that the best successes with this type of net have been obtained during cold winter months when the fish are relatively inactive. Another midwater trawl test is being planned for the winter season.

Cruise 8 of the <u>Metacomet</u> was scheduled to begin September 24 and end October 12. Two types of gear were to be tried out: (1) a 125-fathom half-ring lampara seine for fishing sardine-size herring; and (2) a small-size midwater trawl. The seine was to be tried out as a method of catching sardines in open waters. The smaller midwater trawl was to be tried in order to attain a higher towing speed and to allow taking samples in shallower water than is possible with the larger trawl.

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LAMPARA SEINE, MIDWATER TRAWL, AND DEPTH INDICATOR TESTED BY M/V "METACOMET" (Cruise 8): Tests of three items of fishing gear and apparatus were conducted by the Service's chartered exploratory fishing vessel Metacomet during Cruise 8: (1) a modified lampara seine, (2) a small midwater trawl, and (3) an air-pressure depth indicator.

The lampara seine tried was patterned after a West Coast tuna bait seine with modifications to allow easier setting and partial pursing while hauling. The midwater trawl tested was patterned after the original Barraclough and Johnson trawl as described in Bulletin No. 104 of the Fisheries Research Board of Canada except that all measurements were cut in half and $\frac{3}{4}$ " mesh was used in the last two sections of the cod end. The depth indicator was used to ascertain the depth of the bottom of this net as it was being towed beneath the water surface. Testing was carried out in inshore waters between Portland and East Penobscot Bay from September 26 to October 12, 1956.

Several sets with the lampara seine were completely unsuccessful,

In using the small midwater trawl, it was hoped that the higher attainable towing speeds would result in larger catches. Short trial tows with the small midwater trawl were made in Casco Bay and Penobscot Bay on echo-sounder recordings of fish. Catches were made of up to 215 pounds of herring, averaging approximately $2\frac{3}{4}$ to 4 inches. Indications to date are that midwater trawls will be useful during the seasons of higher water temperatures only as a tool for sampling schools of small herring. The large catches reported taken with this gear in other areas have been made during winter months.

The depth indicator was tested by lowering it vertically into the water to measured depths and by using it attached to the footlines of the midwater trawl when towing over fish located by the echo-sounder. The pressure indicated depths corresponded with the measured depths in the vertical test and fish were taken in the midwater trawl when the indicator showed the net to be moving through a stratum occupied by fish as shown by echo-sounder recordings. Both types of tests substantiate the accuracy of the depth readings indicated.

Cruise 9 of the <u>Metacomet</u> was to be devoted to purse-seining operations. The vessel has been equipped with purse-seining gear and a $1\frac{1}{2}$ -inch mesh purse seine for this cruise. The objectives of the cruise are: (1) to learn if a purse seine can be set and successfully handled in open waters with a New England dragger-type vessel and (2) to attempt to catch sardine-size herring with this type of gear. The cruise was scheduled to start October 19 and end on or about October 27.



North Pacific Exploratory Fishery Program

BOTTOM FISH SURVEY IN WATERS OFF SOUTHEASTERN ALASKA BY M/V "JOHN N. COBB" (Cruise 29): A search for bottom fish in waters off Southeastern Alaska is the purpose of Cruise 29 of the Service's exploratory fishing vessel John N. Cobb. The vessel was scheduled to leave Seattle on October 1 and return on November 16.

The bottom-trawling exploration was to be concentrated on the continental shelf and slope from Dixon Entrance northward to the southern end of Baranof Island.



Mending otter-trawl net aboard the Service's exploratory vessel John N. Cobb. Exploring new grounds means frequent tear-ups.

Commercial-size ofter trawls were to be used, and extensive echo-sounding was to be carried out to determine the extent of suitable bottom. It was planned that trawling was to be conducted out to depths of 200 fathoms or more to determine species and quantities of marketable trawl fish present in these waters at this time of year.

Commercial fishermen have requested exploration of these grounds because it has become necessary for them to go farther from port in recent years in order to bring in good catches. It is thought that species such as Pacific Ocean perch, cod, and "sole" may be present off Southeastern Alaska in quantities sufficient to support profitable fishing. Navigation charts indicate that a considerable part of the bottom is rocky, but certain places with sand or mud bottom appear to be satisfactory for trawling.

The vessel was also to carry shrimp beam trawls, and a limited amount of exploration for shrimp in promising inshore areas was planned, primarily during periods of bad weather when offshore trawling would not be practical.



Oregon

The biologists, stationed at the Commission's Astoria research laboratory, have been testing the effectiveness of a "try net" for possible use in an extensive study of the early growth of Dover sole scheduled to begin next summer. The biologists want to determine if the net can be used practically from a vessel smaller than the normal otter trawler. Through cooperation of the state police, the biologists have been doing their experimental fishing aboard an offshore patrol boat regularly used in law-enforcement work.

The "try net" is a miniature replica of otter-trawl nets used commercially in Oregon waters. It was developed originally by Gulf Coast shrimp fishermen for use in locating commercial concentrations of shrimp. A try net was used successfully by the Commission during a 1951 study of the early growth of English sole in Yaquina Bay, but was not tested in deeper water off the coast.

If the try net will efficiently catch the young flatfish, it will probably be used to obtain monthly samples of Dover sole during the growth study. Fish caught will be measured and examined to determine sex, if possible. "Ear bones" or otoliths and scale samples will be taken from some of the fish captured and will be examined microscopically to find out when the first growth ring is laid down. Such information is necessary for proper management of the Dover sole fishery, the biologists explained.

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FINGERLING FISH PASSAGE AT DAMS TO BE INVESTIGATED: Methods of collecting downstream migrant salmon and steelhead fingerlings from reservoirs at high dams having little or no spill and fluctuating water levels will be investigated by the Fish Commission of Oregon under a \$73,000 contract with the U.S. Army Corps of Engineers.

The study will be initiated at Lookout Point reservoir near Oakridge sometime next spring. In the meantime, for the experiment the Corps of Engineers is constructing a "fingerling collector" consisting of a large pump mounted on a floating platform. Capable of discharging up to 50 cubic feet of water per second, the pump will be used to create water currents with the hope of attracting small fish to a trap installed on the float.

It is a common assumption among fisheries workers that migrant fingerlings can detect and follow water currents in lakes. In nature young sockeye salmon, which spend a part of their lives in lakes, must find obscure outlet streams that will carry the young fish to the ocean. Previous research has shown that the majority of young migrants are concentrated at or near the surface in reservoirs, particularly if there is a surface outlet. The big question is whether or not sufficient numbers of young fish can be attracted by artificially-created currents.

At the time Lookout Point and Detroit dams were constructed fish passage facilities were omitted because no practical method of getting young fish out of the reservoirs was at hand. Perfection of a fingerling collection system might make it possible to bring these large reservoirs into production of salmon and steelhead.

When field tests of the fingerling collector are started next spring, approximately 100,000 blueback (sockeye) salmon fingerlings will be released in Lookout Point reservoir. The bluebacks were obtained as eggs from the U. S. Fish and Wildlife Service hatchery at Leavenworth, Wash., but are being raised at the Fish Commission's Oakridge salmon hatchery.

The fingerling collector will be operated at various locations within a 500-foot radius of the north shore of the reservoir to determine where fingerlings can be collected most efficiently. Test gill nets will be set to assist in locating concentrations of fish near the face of the dam.

The Lookout Point fingerling passage study is part of an extensive research program financed by the Corps of Engineers to investigate hydroelectric development problems affecting fish. Under the same program, the Oregon Fish Commission is currently studying possible delays in upstream fish migration at Columbia River main stem dams and is conducting research on the size and migrational habits of salmon and steelhead runs in the Snake River system.

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NORTHWEST ALBACORE TUNA CATCHES SAMPLED: With the return of commercial quantities of albacore tuna to the Oregon coast this year, the Oregon Fish Commission albacore biologist sampled albacore catches daily and interviewed boat

skippers to obtain all available information on the elusive "chicken of the sea." The last good catch of albacore in Oregon waters was in 1950. During the "lean" years, the Oregon biologist had to rely upon samples of California catches of albacore landed at Astoria by local boats late in the season.

About 1,500 tuna were to be sampled this past fall to determine the size makeup of local catches. The biologist also took scale samples and cut the tails of the first 20 fish in each sample to obtain the 33rd vertebra used in aging albacore.

"Cutting the tails off the fish is the easiest part of aging the fish," claims the biologist. The tails are boiled to obtain the vertebra for close examination. Growth rings on the vertebra reveal the age of the fish.

The size of albacore taken off Oregon this year steadily decreased. The average weight was 17 pounds when fishing started but dropped to 12 pounds. This was common in former years of albacore fishing off Oregon, according to the biologist. The largest albacore seen by the biologist was a 45-pounder. Even 30-pound fish are scarce in Oregon catches.

The Oregon Fish Commission biologist participated in a seven-week research cruise this summer that definitely established the fact that albacore were present in Oregon waters this year. The Oregon biologist stated that albacore could have been off Oregon last summer, but none were caught or sighted last season.



Pacific Oceanic Fisheries Investigations

EXPLORATORY TUNA FISHING AROUND MARQUESAS ISLANDS BY M/V "CHARLES H. GILBERT" (Cruise 30): A 51-day exploratory tuna fishing cruise to the Marquesas Islands was completed by the Service's research vessel Charles H. Gilbert when she returned to Honolulu on September 26, 1956. The principal purpose of the cruise was to explore the tuna fishing potential of the waters around the French colony which, except for Easter Island, is the outpost of Polynesia closest to the present fishing grounds of the California tuna fleet and therefore of considerable interest to the Mainland tuna industry.

A total of 20 days were spent long-line fishing, 16 days on the open seas east of the group, and 4 days in inshore waters. Catches were generally low. The best daily catches of each species were 20 yellowfin, 14 albacore, and 7 bigeyed tuna. Some of the big-eyed taken were unusually large, the heaviest one weighing 370 pounds. The best albacore catches were made at the most southerly locations fished around the islands.

The vessel also spent 12 days in scouting for schools of tuna at the surface, intending to fish them with pole-and-line using Marquesan sardines as live bait, the fishing method that California fishermen would employ were they to move into this area. Few schools were found, however, in this Southern Hemisphere winter season, and those that were sighted were composed of small skipjack, weighing about 5 pounds, and "wild" and unresponsive to the attempts made to fish them. Only one yellowfin tuna was taken at the surface, on a trolling line. Four 40- to 60-pounds dogtoothed tuna, a species not found in Hawaiian waters, were caught while trolling over banks.

Fishing was conducted by the vessel around all of the 11 islands of the Marquesas group, and the party landed at Taihohae, the French administrative center, and at Taipi Valley. The bait resources at these two places were surveyed and samples of the sardines were taken for experimental fishing in Marquesan waters

and for introduction into the Hawaiian area. The vessel brought back to Oahu 21 buckets, or about 2,500 fish, alive and released them in Hanauma Bay. If this introduction is successful and the Marquesan sardines manage to adapt themselves to Hawaiian conditions and increase, they may help ease the critical shortage of live bait in the Hawaiian skipjack (aku) fishery.

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GOOD ALBACORE FISHING FOUND NORTH OF HAWAII BY M/V "JOHN R. MANNING" (Cruise 32): Prospects for development of a fishery for the valuable albacore tuna in central Pacific waters north of the Hawaiian Islands have been considerably brightened by the excellent catches made on the most recent exploratory fishing cruise in that area by the U. S. Fish and Wildlife Service research ship John R. Manning. The vessel returned to Honolulu September 12, 1956, from a trip of nearly 2 months which took the vessel all the way to the Aleutian Islands where she delivered to a local cannery 4 tons of albacore captured by gill-netting and trolling. Although Hawaii has at present a well-developed local fishery for skipjack, which is canned as "light-meat" tuna, and a smaller long-line fishery which delivers yellowfin and big-eyed to the fresh fish market, the higher-priced albacore is not now landed in the Islands in significant quantities. Development of a Hawaii-based fishery for this species would make an important contribution to the fishing industry of the Territory.

The vessel's explorations covered the area between the longitudes of 175° W. (roughly north of Midway Island) and 145° W. (northeast of the main Hawaiian Islands). The greatest abundance of albacore was found in the western part of this area, between 43° N. and 47° N. latitudes, with a marked falling off in the catches east of 160° W. Surface trolling with six lines was done during the day, and sets of gill nets and trammel nets of various mesh sizes were made during the night. Gill-netting was much more productive than trolling, with approximately 500 albacore taken in the nets as compared with 100 on the trolling lines. Net catches ran as high as 89 fish a day, although only 8 of the 12 nets used had meshes of a size suitable for the albacore encountered on this cruise.

Exploratory fishing was supplemented with studies of the albacore's environment through collection of plankton, measurement of water temperatures and transparency, and observation of sea birds and marine life. Considerable numbers of large squid and of such small pelagic fishes as pomfret and saury were seen and specimens were collected. Experiments in night trolling with luminous lures and in live-bait fishing using sand launces collected in the Aleutians were attempted but without success. Eighty-six albacore were marked with plastic tags and released alive in order to study their migrations and growth rate. Earlier recaptures of such tagged fish have indicated a possibility that the stocks of albacore which support large commercial fisheries off the North American and Japanese coasts may migrate across the Pacific north of Hawaii.

Interesting sidelights of the voyage include the capture in the gill net of five salmon and one fur seal, which were turned over for study to Fish and Wildlife Service representatives in the Aleutians.

The Service's John R. Manning has been operating to the north of Hawaii, surveying the abundance of albacore tuna between longitude 175 $^{\rm O}$ W. and 145 $^{\rm O}$ W. Her survey is being coordinated through the Albacore Steering Committee with similar surveys between 145 $^{\rm O}$ W. longitude and the Pacific coast by the U. S. Fish and Wildlife Service exploratory fishing vessel John N. Cobb, and the Brown Bear of the University of Washington, the latter cooperating with the Oregon Fish Commission.

The results reported by the \underline{John} R. Manning fit well with those obtained by the \underline{John} N. Cobb which caught no albacore along 145° W. The results are also completely compatible with the picture developed during last summer's surveys. During 1955 albacore tuna appeared most abundant to the west, became very scarce or disappeared in the general vicinity of 145° W., and were located in fair numbers again off the coast of Oregon and northern California by the John R. Manning.

Fragmentary reports from the Pacific Coast indicate that some commercial operators followed the leads provided by the research vessels this summer and last summer and fished for albacore off Oregon with some success.



Transportation Rates

RAILWAY EXPRESS SEEKS INCREASE IN EASTERN TERRITORY: The Railway Express Agency in August 1956 filed another petition with the Interstate Commerce Commission seeking an increase of 15 percent on all less-carload charges on shipments within Eastern Territory. This territory covers the area abounded by Mackinaw City (Mich.), Chicago, St. Louis, Paducah, Cincinnati, Norfolk, and Eastport (Maine). The Agency states it is asking for surcharge on traffic in this area to eliminate huge passenger-train deficits, which include express traffic.

This action follows a recent announcement of several Eastern lines that firstclass rail fares will be increased 45 percent and coach fares 5 percent in order to reduce passenger deficits.



Reclamation to Build Fish Screen to Save Young Fish on Delta-Mendota Canal, California

A unique "fish screen" will save millions of young salmon, striped bass, shad, and catfish from the turbulence of the world's second largest pumping plant--the



Fig. 1 - Looking downstream on secondary louvers with traveling screen unit and pumping plant in background.

Bureau of Reclamation's Tracy Pumping Plant on the Delta-Mendota Canal in central California. The Secretary of the Interior announced on October 27, 1956, details of a \$988,116 contract for constructing the facilities.

A commercial and sport fishery resource estimated to be worth \$10,000,000 annually will be protected by the fish diversion and collecting facilities, said the Commissioner of Reclamation.

Existing temporary fish screens will be replaced by a louver-type diversion that "leads" the fish to safety. The novel design of the new facilities was developed after long and intensive study by Bureau of Reclamation engineers and Fish and Wildlife Service

biologists, with the assistance of the California State Department of Fish and Game.

The fish protective device will consist of a row of vertical louvers extending approximately 340 feet diagonally across a concrete channel $83\frac{1}{2}$ feet wide and 25 feet deep. The minute baby fish, averaging an inch long, are carried tail first

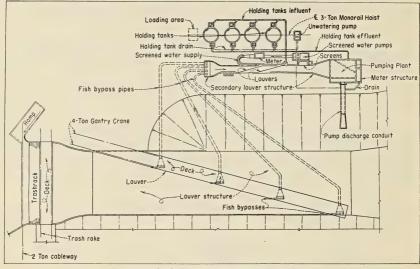


Fig. 2 - Sketch plan -- Tracy Fish Collecting Facility.

down the channel by the current, but as they approach the louvers they swing to one side to avoid the disturbing eddies and sounds made by the slats placed at an angle to the current. The fish keep mov-

ing over until they are siphoned into a bypass that carries them to a holding tank.

From holding tanks, the young fish are to be counted and trucked 40 to 50 miles to an area where they can swim safely to the sea.

The Tracy Pumping Plant, which draws water from the Delta area of the San Joaquin and Sacramento Rivers at the head of San Francisco Bay, lifts 4,600 cubic-feet-per-second of irrigation water 197 feet into the Delta-Mendota Canal which carries it 120 miles to supply Central Valley lands.

The Delta, with its maze of channels, is the most important spawning



Fig. 3 - General view of construction of holding tanks, secondary louver, and pumping plant areas for the Tracy Pumping Plant on the Delta-Mendota Canal in Central California.

and rearing area for striped bass and shad on the Pacific Coast. Young king salmon are found in great numbers in the waters of the Delta where they loiter on their way to the ocean. Catfish are an important sport fish taken in large numbers and spend their life cycle in the Delta waters.

Salmon, striped bass, and shad are anadromous fish. That is, they spawn in fresh water but spend their adult lives in the ocean. The young fish descend the rivers to the sea, carried by and following the major flows of water. Thus, the major diversion of the Delta-Mendota canal operating at full capacity would be nearly as great an attraction to these young fish as would the combined river flows to the ocean. Fish experts believe the great pumps of the Tracy plant would kill a major portion of fish entering the canal, and the fishery resource—of considerable importance to California—would be seriously damaged.

Devices to protect fish are included wherever necessary on all features of the Central Valley project, which provides irrigation water for 634,000 acres and produces 2,226,370,000 kilowatt hours of power annually from its multipurpose dams. Planned release of cool water from major dams such as Shasta, Keswick, Nimbus, and Folsom, helps maintain conditions favorable to salmon.



Saltonstall-Kennedy Act Fisheries Projects

FISH AND WILDLIFE SERVICE REPORTS PROGRESS MADE: Progress which the U.S. Fish and Wildlife Service has made with Saltonstall Kennedy Act funds in the fields of research, exploration, technology, marketing, and education on behalf of the fishing industry and the consumer is detailed in a report to Congress just released by Secretary of the Interior Fred A. Seaton. The report describes the accomplishments in the fiscal year ending June 30, 1956, and outlines the projects which are being undertaken during the current fiscal year.

The additional funds made available as the result of the amendment to the Saltonstall-Kennedy law by the Fish and Wildlife Act of 1956 will be allocated in the near future in light of the advice of the American Fisheries Advisory Committee which met in Chicago on October 11 and 12.

The report divides the Saltonstall-Kennedy work into two categories--Fishery Biological Research for which \$1,385,000 was allocated for fiscal year 1956 and \$1,376,500 for fiscal year 1957; and Commercial Fishery Studies, with \$1,426,000 allocated in fiscal year 1956 and \$1,418,500 available for fiscal 1957. The balances were absorbed by administrative expenses.

Research on Alaska salmon, the Pacific sardine, the North Atlantic trawl fishes, herring, Gulf of Mexico fishes, striped bass, menhaden, and a phase of the ocean research program took \$1,041,000 in the past fiscal year; \$1,063,700 is allocated to the same group of projects for the current year. The money for oyster research in the Gulf, mid-Atlantic, and New England areas is the same for each year, \$75,000, with each fishery getting \$25,000. The big Pacific Oceanic studies which are based at Hawaii and which are to define the location of albacore tuna stocks in waters north of Hawaii had \$234,000 in 1956 and have \$227,000 in 1957.

The Commercial Fishery Studies include exploratory fishing and gear research, fishery technological studies, commercial fishery statistics, commercial fishery economic studies, and fishery education and market development.

The exploratory fishing and gear research work includes a Maine sardine program (coordinated with the biological work on the sardine and North Atlantic explorations for new fishing grounds) and South Atlantic exploration primarily for valuable offshore shrimp (which are being located in commercial quantities). The total allocated was \$299,000 for fiscal 1956 and \$304,000 for fiscal 1957.

The fishery technological studies include research on the handling of the southern oyster, development of voluntary standards for fishery products, development of a chemical index for the nutritive value of fish meal, creating of new uses for fish oil, improvement in the quality of skipjack tuna, and a Great Lakes survey. All of these programs will be carried on through fiscal 1957 except the Lakes (\$15,000) survey which was completed in 1956. The amount allocated was \$464,000 in 1956 and \$5,000 less in 1957.

The commercial fishery statistical program has been allocated \$200,000 for each year. The economic studies which dealt primarily with fish consumption and economic surveys of certain segments of the fishing industry used \$148,000 in 1956 and have \$138,000 for 1957.

Fishery education and market development include such projects as creating new markets for underutilized fish, test kitchen activities to develop recipes for cooking fish, increasing the sale of fish to frozen food lockers, exhibits at national conventions, promotion of the use of fish in school lunch programs, production and distribution of motion pictures relating to the fishing industry, special market studies, preparation of market aids, and the issuance of numerous publications. For this work \$315,000 was spent in 1956 and \$317,500 is allocated for the current fiscal year.

The Alaska salmon research is concentrated on problems for which answers are needed urgently in the management of the fisheries. The studies are being made in Bristol Bay, considered the most critical management area in the Alaska fishery. Methods of counting downstream migration to be used for the prediction of the runs, methods of counting adult escapement, and general problems concerning the migration routes are among the items being studied.

The Kvichak River system, the largest red salmon stream in Alaska, is the scene of a project which includes a survey of the spawning grounds, a determination of the age and size of the fish commercially taken, the age and size of those which escape, and counts of salmon heading for the sea for their long tenure in the open waters.

There are two predator studies being made—one relating to the extent of predation on salmon runs by fish, bird, or mammal predators and another study to determine whether or not the sea lions and hair seals of western Alaska prey upon salmon. There are studies on counting salmon in small streams, counting salmon by the use of towers which give the observer a place of vantage, and another study on counting the fingerling red salmon in Bristol Bay. Still another project deals with the effect of logging upon salmon streams.

In the Gulf of Mexico much of the work has been done on shrimp and on red tide investigations, but menhaden and sponges have also come in for research and study.

One important goal in the ocean research is to "reach a scientifically sound understanding of what the weather does to change conditions in the sea and what these changes in the sea will do to the numbers, distribution, and fishery yield of the ocean fish populations." Fish and wildlife biologists believe that when this understanding is reached with sufficient correctness to assure predictions, a new door will be opened to more efficient fishing and to make the various fisheries safe from overexploitation.

In the area of exploratory fishing and gear research, extensive information has been obtained on bottom trawling; offshore stocks of shellfish and pelagic fish were explored; the possibility of a shrimp industry off Nova Scotia was studied; midwater and otter trawls and lampara seines were tested; the possibilities of a new red

shrimp industry in the South Atlantic brought some optimistic results; and considerable laboratory work on gear development was accomplished.

One of the fields of technological research concerned the discovery of new uses for fish oils. One result of this work is the "breaking down" of certain chemical components of fish oil. This could open the way to the creation of many new products, just as did somewhat similar work on coal. Other technological projects included freezing studies, storage, new uses for fish meal, and scales.

The market and economic studies were designed primarily to learn where the fish distribution and utilization pattern was weak and to find out why. Among the projects were many consumer surveys which develop information to help the fish producer better meet the needs and desires of the customer.

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AMERICAN FISHERIES ADVISORY COMMITTEE RECOMMENDS STEPPED-UP RESEARCH PROGRAM: The American Fisheries Advisory Committee, at its fourth meeting held in Chicago on October 11 and 12, 1956, urged immediate implementation of a greatly expanded and balanced program of technological, biological, ecomomic, and marketing research and services to be financed with the additional money now available under the Fish and Wildlife Act of 1956, U. S. Fish and Wildlife Service Director John L. Farley reported October 23.

The Service Director presided over the meeting as Acting Chairman.

The Saltonstall-Kennedy Act which was passed in 1954 to promote increased production and marketing of domestic fishery products was due to expire on June 30, 1957. The Fish and Wildlife Act of 1956, approved by the President on August 8, extended the provisions of the Saltonstall-Kennedy Act on a permanent basis. The limitation of \$3 million annually for research has been removed and the entire amount of 30 percent of gross customs receipts on fishery products now becomes available on an "annual accrual" basis.

The Committee reaffirmed its previous recommendations regarding the use of a series of criteria for judging project proposals on a broad national basis which were developed at its first meeting in April 1955. It recommended continuance of contract research where a specific type of specialized research can best be done by universities or private research organizations. The Committee expressed concern over the ability of industry to outbid the Service in recruiting and holding highly-trained technicians.

The 16 members of the Committee who attend the meeting were: Harold R. Bassett, Salisbury, Md.; Lawrence Calvert, Seattle, Wash.; James S. Carlson, Boston, Mass.; Chris Dahl, Petersburg, Alaska; Mark L. Edmunds, Garibaldi, Ore.; David H. Hart, Cape May, N. J.; Leon S. Kenney, St. Petersburg, Fla.; Donald P. Loker, Terminal Island, Calif.; J. Richards Nelson, Madison, Conn.; Moses Pike, Eastport, Me.; H. F. Sahlman, Fernandina Beach, Fla.; Thomas F. Sandoz, Astoria, Ore.; Arthur Sivertson, Duluth, Minn.; Lawrence W. Strasburger, New Orleans, La.; Earl B. Webster, Brownsville, Tex.; and Alphonse J. Wegmann, Pass Christian Isles, Miss.



Shellfish Sanitation Workshop

The Shellfish Sanitation Workshop, which is primarily a meeting of State Public Health officials with officials of the U. S. Public Health Service, was held in Washington, D. C., August 27-28, 1956.

The objectives of the meeting were: (1) the consideration of revisions for the Manual of Recommended Practices for Shellfish; (2) the development of a workable market index of quality for shellfish; and (3) the formation of an advisory committee that would work with the U. S. Public Health Service and eliminate some of the administrative difficulties presently encountered in carrying out such projects as the manual revision.

The proposed changes for the present draft of the Manual of Recommended Practices were discussed and it was felt that approval by those present represented



sufficient authority to allow publication of the manual with the changes agreed upon for use during this oyster season.

The two items of greatest importance to the oyster industry approved for the Manual were the provisions to eliminate galvanized returnable containers effective December 1960 and the provision to eliminate dip buckets for use by shuckers. It was agreed, however, that a container with flowing water could be used by the shuckers for washing their hands while in the process of shucking.

The second day's session was devoted to several technical papers relating to the bacteriological examination

of shellfish. One of the papers referred the determination of the uptake and concentration of coliform organisms from waters of known or controlled concentration.

Another paper presented by a representative of the Canadian Department of National Health and Welfare gave the procedure used by Canada for inspection of shellfish imports from the United States. Since there is no market index standard, the Canadians, without any definite basis for the decision, selected an arbitrary maximum of 2,400 coliform per hundred milliliter as defining acceptable oysters. A second class, "acceptable on condition," was defined as shipments with coliform most probable number (MPN) between 2,400 and 160,000. These were accepted but required notification of the U. S. Public Health Service for investigation and remedial action as necessary. An unsatisfactory report or no report led to suspension of future shipments from this shipper. The third class, rejected, consisted of any oysters with MPN in excess of 160,000. They notice a marked geographical difference in the shipments within the groups. Ninty percent of "Northern" oysters could meet the acceptable 2,400 MPN, but only 15 to 45 percent of "Southern" samples met this standard. "Southern" in this case meant Maryland, Virginia, and Delaware.

The next report was given by a representative of the New York City Health Department. This group has applied a standard of 2,400 MPN as a maximum acceptable level, but have attempted to preserve a flexible method of application, and to investigate before excluding any shipper from the New York market. He also indicated the feeling of a need for control measures, but uncertainty about, or dissatisfaction with, the selected level.

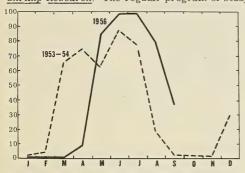
The afternoon session was given over to a discussion of the morning papers and an attempt to reach an acceptable limit which would permit a reasonable percentage of Chesapeake Bay oysters to be shipped interstate. The market index finally adopted was similar to the Canadian code. The only difference was a compromise, increasing the upper limit for Group 1 acceptable oysters to a coliform MPN of 16,000. The other limits of the Canadian code were retained as is.

It was decided to table any further action on the appointment of an advisory committee until a meeting of the same group in 1957, since the two more important objectives, approval of the manual and establishment of an interim market index, had been satisfactorily acted upon.



South Carolina

FISHERIES BIOLOGICAL RESEARCH PROGRESS, JUNE-SEPTEMBER 1956: Shrimp Research: The regular program of study on the shrimp and shrimp indus-



Proportions of brown shrimp to total shrimp catch from Bears Bluff Laboratories trawl records.

try was continued June-September 1956 at the Bears Bluff Laboratories, according to the Progress Report No. 29 issued by them. Forty-seven experimental drags were made at the regular stations established in 1952. The usual hydrographic information, plus data on size, weight, abundance of each species of marine organisms was tabulated for each drag. In addition 9 experimental trawl hauls were made in deep water offshore by the larger research vessel, the T-19. The number of offshore trips was cut due to bad weather layup for repairs, and the necessity of using the crew on the smaller vessel for inshore work.

Records gathered by both research vessels clearly indicate that the shrimp fisheries was almost entirely dependent on the brown shrimp during the period covered by this report. Ordinarily by mid-July and August the relative proportion of brown shrimp drops off as the white shrimp enter the commercial catch. This year in July and August, the brown shrimp accounted for more than 90 percent of the catch. A few white shrimp began to make their appearance in September. The graph indicates the relation of brown to white shrimp in 1956 as compared with laboratory records for the years 1953 and 1954 combined.

A close study of the landings of shrimp from the several hundred commercial fishing boats along the South Carolina coast this year has not been undertaken by Bears Bluff, but from casual interviews with commercial fishermen indicates the relative abundance of white shrimp is decidedly below that of the past few years. This is not universally true along the coast and apparently in a few areas (Georgetown and Charleston) white shrimp are abundant.

Records of the Laboratories' vessels indicate that white shrimp were almost 15 times more abundant in July 1953 and 1954 than they were in 1956; 9 times more in August; and 9 times more in September.

Although no clear-cut reason is apparent for these differences, there are several indications which tend to show that a deficiency of rainfall in the past two years plays an important part in this shortage.

Facilities for Research Improved: An indication of the changes in salinity in inshore environment of South Carolina marine fisheries were noted by a researcher at the Laboratories in July-August 1956. The researcher pointed out that "As a result of the long drought in South Carolina, sea water has filled the streams and moved far up in the rivers and creeks, making formerly low salinity streams into estauries almost as salty as the ocean." The far-reaching importance of such changes influenced The Agricultural Society of South Carolina to grant the greater portion of the necessary funds to Bears Bluff Laboratories to undertake a long-range study on the influence of salinity on marine fisheries. A 535-foot 6-inch well has been sunk in the Laboratories' yard. The County of Charleston will deepen and increase the holding capacity of the fresh-water lake. Pumping water into the lake from the well will allow the storage of sufficient fresh water so that "irrigation" of the salt-water ponds can be achieved. In this way salinity can be reduced in the experimental ponds from full sea strength to any degree of saltiness. Thus the mechanical and engineering requirements of an important research program are already accomplished.

The old 40-foot research boat has been replaced by a new one. A 40-foot cabin cruiser with a Diesel engine has been obtained from the Charleston Transportation Depot of the Army. The official transfer was made August 22. Conversion is in progress. The boat will soon be put into service studying the marine fisheries of the State.

Sport Fishing and Hunting Survey Reveals \$3 Billion Annual Expenditures

A total of 25 million American anglers and hunters (1) spent nearly 3 billion dollars for 500 million days of sport, (2) drove their automobiles more than 10 billion miles; and (3) spent an average of \$114.42 apiece in the pursuit of these recreations in 1955.

Those facts are among the findings of the first national survey of fishing and hunting ever conducted in the United States. The survey was made under the direction of the U. S. Fish and Wildlife Service at the recommendation of the International Association of Game, Fish and Conservation Commissioners as a basis for a better understanding of the recreational value of hunting and fishing in terms of financial outlays and individual participation, Secretary of the Interior Fred A. Seaton said September 15, 1956.

This project cost \$134,000 and was financed through Federal aid funds which are derived from the Federal excise tax on sporting arms and ammunition and on fishing rods, reels, creels, artificial lures, baits, and flies.

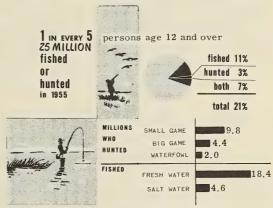
The data obtained in the survey pertain to the calendar year 1955 and to persons 12 years old and older. The information is the result of the work of 300 interviewers working in 250 places in the 48 states. About 20,000 homes were contacted in a representative cross section of the Nation and 6,220 anglers and 3,108

hunters interviewed. The survey was carried out by Crossley, S-D Surveys Inc. of New York on a sample scientifically designed to give the national picture.

The survey showed that: (1) one American household out of every three had at least one member who hunted or fished or who did both; (2) one house in every two

in the rural areas and one out of every six in the big cities have at least one person who casts a line or draws a bead; (3) one out of every five Americans 12 years old or older either hunted or fished.

Hunting and fishing appeal to all age groups from 12 years to 65-plus but seems slightly more popular in the age groups, 12-17 and 35-44. Hunting appeal holds relatively steady through the groups from 12 years to 44 years and then the number of nimrods begins to decline.



Of the 118,366,000 individuals aged 12 and over in the United States the survey found that 24,917,000 hunted or fished or did both.

There were 13,133,000 who fished only; 4,104,000 who hunted only; and 7,680,000 who did both. Five million women fished and nearly half a million hunted.

More than 7 million anglers--mostly salt-water fishermen, women and youths--did not need to obtain a license to fish. (In nearly all coastal States, salt water fishing does not require a license.)

Fresh-water fishing (18,420,000 anglers averaging 18 days apiece) and small game hunting (9,822,000 hunters averaging 12 days apiece) are the most popular of the fish and game sports.

Nearly 4.5 million big-game hunters averaged seven days apiece in quest of their quarry; nearly 2 million sought out the waterfowl on the many marshes; and more than 4.5 million anglers sought their catches in the salt-water sport fisheries.

The 24,917,000 who hunted and fished spent \$2,851 million in pursuit of this sport, an average of \$114.42 apiece. Of the total amount, \$1,282,300,000 was spent for equipment; \$1,298,800,000 for food, lodging, and transportation on hunting and fishing trips; \$81,300,000 for the various licenses including duck stamps; and \$188,600,000 for all other expenses. The individual spent an average of \$51.46 for equipment; \$52.13 on trips; \$3.26 for licenses; and \$7.57 for miscellaneous expenses.

The 20,813,000 anglers spent slightly more than \$1,914,000,000, while the 11,784,000 hunters spent \$936,687,000. The average fisherman spent \$91.98 and the average hunter spent \$79.49. More than 7 million of these individuals both hunted and fished which accounts for the general average of \$114.42 per person spent in 1955 for this type of recreation.

There was wide variation in expenditures on a regional basis. The salt-water fisherman on the Pacific Coast--1,137,000 of them-spent \$156 each while their salt-water counterparts on the Atlantic and Gulf Coasts spent \$91 each. The average of all salt-water anglers was \$107 per person while the average expenditure by the fresh-water angler was \$77.

The duck hunters spent \$119,000,000 or \$60 apiece; big-game hunters expended \$73 each; and small-game hunters \$50 each.

The complete report (National Survey of Fishing and Hunting) is a 52 page publication which includes 20 charts and 18 tables. It is for sale by the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C., at 40 cents a copy.

United States Fishing Fleet ¹/₄ Additions

AUGUST AND SEPTEMBER 1956: A total of 55 vessels in August and 34 vessels in September of five net tons and over were issued first documents as fishing craft.

III coptoined of five									0	
Table 1 - U. S. Vessels Issu August-Sej	First Docum	nents as	3							
Area	August September JanSept. Total 1956 1955 1956 1955 1956 1955 1955									
			(1	Number)			Net Tons	Aug.	Sept.
New England	2	1	1 1	-	13	16	18		(No	.)
Middle Atlantic	2	2	-	-	21	11	13	5 - 9	29	20
Chesapeake	9	5	12	2	87	34	54	10 - 19	11	6
South Atlantic	19	7	12	3	92	50	65	20 - 29	6	2
Gulf		14	6	8	83	77	103	30 - 39	7	6
Pacific	5	15	1	6	68	107	117	70 - 79		-
Great Lakes	-	1	-	1	2	7	9	100 - 109	1	-
Alaska	6	5	2	1	39	31	35	Total		34
Hawaii	-	-	-	1	-	3	3			
Wirgin Islands	-	-	-	-	-	-	1	The total for	A 11011	et 195
Total	55	50	34	22	405	336	418			
Note: Vessels assigned to the various sections on the basis of their home ports.										

was higher by 5 vessels than for the same month ther 1955 by 12 vessels.

in 1955. The September 1956 total exceeded that for September 1955 by 12 vessels. During the two-month period, the South Atlantic area led all others with a total of 31 craft, followed by the Chesapeake Bay area with 21, the Gulf of Mexico 18, Alaska 8, Great Lakes 6, New England 3, and the Middle Atlantic 2.

1/ Includes both commercial fishing and sport fishing craft.



U.S. Fish Stick Production

JULY-SEPTEMBER 1956: During the third quarter of 1956, the United States production of fish sticks by 38 manufacturers totaled 11.5 million pounds. This was 2.4

Table 1 - U. S. Fis	sh Sticks	Producti	on				
Month	Cooked Uncooked Total						
	(Million Pounds)						
July	2.8	0.4	3.2				
August	3.5	0.6	4.1				
September	3.6	0.6	4.2				
Total 3rd Quarter:							
1956	9.9	1.6	11.5				
1955	12.5	1.4	13.9				
Total JanSept:							
1956	34.8	4.7	39.5				
1955	44.3	5,7	50.0				

million pounds (18 percent) less than the quantity produced during the corresponding period of 1955 are only 1 percent above the 11.4 million-pound output of the second quarter of 1956.

Production during the third quarter of 1956 averaged 3,8 million pounds a month as compared with an average monthly production of 4.7 million pounds during the third quarter of last year. The largest quantity of fish sticks ever produced durated to the sticks of the s

ing a single month occurred during March 1955 when 7.4 million pounds were packed.

During the third quarter of 1956, 86 percent of the total production was precooked and 14 percent uncooked. During this same quarter, 23 manufacturers located in

the Atlantic Coast States produced 9.5 million pounds or 81 percent of the total. Plants located in the interior of the country and in the Gulf States manufactured 1.2 million pounds of fish sticks and firms situated in the Pacific Coast States produced 836,000 pounds.

Table 2 - U. S. Fish Sticks Production by Areas July-September 1956 and 1955									
July-September									
Area	1	956	1955						
Area	Firms	Million Lbs.	Firms	Million Lbs.					
Atlantic Coast States	23	9.5	28	10.9					
Interior & Gulf States	5	1.2	7	1.6					
Pacific Coast States	10	0.8	12_	1.4					
Total	38	11.5	47	13.9					

Note: Also see Commercial Fisheries Review, August 1956, p. 50.



U.S. Foreign Trade

EDIBLE FISHERY PRODUCTS, JULY 1956: United States imports of edible fresh, frozen, and processed fish and shellfish in July rose 21.7 percent in quantity and 11.2 percent in value as compared with June 1956. Compared with July 1955 the imports for July 1956 decreased 3.4 percent in quantity, but were 17.7 percent

United States Foreign Trade in Edible Fishery Products, July 1956 With Comparisons										
		Quantit	У							
	Jı	July		Jul	У	Year				
	1956	1955	1955		1955	1955				
Imports:	(Milli	ons of	(Mi	illions of \$)						
Fish & shellfish:										
Fresh, frozen, & processed \(\frac{1}{\cdots} \)	71.1	73.5	769.9	21.9	18.6	206.4				
Exports:										
Fish & shellfish:										
Processed 1/only (excluding fresh &										
frozen)	5.9	4.8	01.0	1.3	1.2	21.6				
Note: Includes pastes, sauces, clam chowder, and juice, and other specialties.										

higher in value. July 1956 imports averaged 30.8 cents a pound as compared with 25.3 cents a pound for the same month in 1955 because of the higher prices prevailing for many imported fishery products.

Exports of processed fish and shellfish in July 1956 declined about 9 percent compared with the previous month, but were 23 percent above the same month in 1955. The July 1956 value of these exports was the same as the previous month, but was higher by 8.3 percent than for the same month a year ago.

* * * * *

IMPORTS OF CANNED TUNA IN BRINE UNDER QUOTA PROVISO: The quantity of tuna canned in brine which may be imported into the United States during the period from April 16 through December 31, 1956, at the $12\frac{1}{2}$ -percent rate of duty is limited to 28,757,393 pounds. Any imports in excess of that quantity will be dutiable at 25 percent ad valorem.

Imports under the quota for the period from April 16 through September 29, 1956, amounted to 20,745,940 pounds, according to data compiled by the Bureau of the Customs. This leaves a balance of 8,011,453 pounds of the quota which may be imported in the last months of 1956 at the $12\frac{1}{2}$ -percent rate of duty.

A proclamation, issued by the President on March 16, 1956, gave effect to an exchange of notes with the Government of Iceland to withdraw tuna canned in brine from the 1943 trade agreement and invoked the right to increase the duty reserved by the United States in negotiations with Japan and other countries under the General Agreement on Tariffs and Trade.

The quota is based on 20 percent of the previous year's United States pack of canned tuna, prorated to account for the months that had elapsed during 1956 before April 16, the effective date of the action.

* * * * *

Imports of blocks and slabs of groundifsh reversed the general trend noted earlier in the year--July imports were 57 percent above a year earlier. Imports for the first seven months of 1956 were, nevertheless, 28 percent less than in 1955.

Swordfish: July imports were 6 percent less than a year earlier, and the first seven months total was 11 percent less than a year earlier.

Tuna: There was an over-all decline in frozen tuna imports, but an increase in canned tuna. Fresh or frozen tuna: due to a drop of some 10 million pounds in albacore, July tuna imports were 49 percent less than a year ago. First seven months 1956 total tuna imports were 20 percent below a year ago; only half as much albacore was received but 9 percent more of other species. Canned tuna: July imports, practically all canned in brine, were 26 percent more than a year earlier. First seven months 1956 total imports were up 22 percent, canned albacore tuna was up 29 percent, other species 18 percent.

 \underline{Bonito} and $\underline{Yellowtail}.$ July imports 40 percent less than a year ago. Total imports for first seven months this year were down 15 percent.

Salmon: Canned salmon imports continued to gain, frozen salmon declined. Frozen salmon imports during July were 23 percent less; seven months total down 49 percent against last year. Canned salmon: July imports were about three times those of a year ago; seven months total 8 times that of 1955. Principal gain in imports was from Japan, but also due to tripled Canadian imports.

Sardines: In line with the previous trend, July imports down 86 percent from year ago. Imports during first seven months were 20 percent less.

Shrimp: July imports exceed year ago by 24 percent. Total for year through July was 48 percent greater. Principal gain in imports was from Mexico, but Panama, Ecuador, and Japan all showed substantial increases over year ago.

<u>Lobster:</u> Canned imports for first seven months down 2 percent. Frozen lobster July imports 20 percent greater than a year ago. Total for first seven months up 6 percent. Imports from Canada and Mexico less than a year ago. Increases principally from Union of South Africa, New Zealand, and Cuba.

<u>Crab Meat</u>: Canned July imports were double those of a year ago. Imports for year through July increased 65 percent.

Fish Meal: July imports down 15 percent. Receipts for first seven months 5 percent more than previous year.

Exports: Little change in exports of fishery products during July. Imports for year through July were 83 percent less for canned salmon, 11 percent more for canned sardines and 27 percent more for fish oils.

* * * * *

GROUNDFISH FILLET IMPORTS DECLINE IN SEPTEMBER 1956: A total of 9.1 million pounds of groundfish (including ocean perch and fish blocks) was imported in the United States during September 1956. Imports of these products during the like period of 1955 amounted to 10.4 million pounds. The decline of 13 percent was caused primarily by lighter receipts from Canada (down 32 percent) which offset the 1.7-million-pound increase in fillets from Iceland. Imports from Norway and the Netherlands also were somewhat larger while receipts from Denmark and West Germany were less than in September 1955.

Groundfish and ocean perch fillets received from Canada during September 1956 amounted to 6.1 million pounds--67 percent of the month's total receipts. Iceland accounted for 28 percent of these imports while the remaining 5 percent were received from Norway, Denmark, the Netherlands, and West Germany.

Thirteen countries exported 103.0 million pounds of groundfish and ocean perch fillets to the United States during the first nine months of 1956, compared with 97.7 million pounds during the corresponding period of 1955. Canada (68.1 million pounds) led all other countries and accounted for 72 percent of the nine-month total imports. Iceland (17.4 million pounds) was in second place, followed by Norway (2.7 million pounds), Denmark (2.5 million pounds), and West Germany (1.7 million pounds).

1

White House Pays Tribute to Fishing Industry

In a telegram addressed to the Chairman, National Fish Week Committee, the President, on October 16, congratulated the Fishing Industry for its efforts and contributions to the National Economy. The telegram reads as follows:

"To the Fishing Industry of America, I send greetings. Every part of your industry contributes its share to the National Economy and to the nutritional well-being of our citizens. The combined work of fishermen, processors, and distributors enables this country to enjoy the widest variety of fish and shellfish in the world.

"My congratulations go to your 87,000 Commercial Fishermen and to the Fishing Industry which supplies the nation with more than four and one half billion pounds of sea food every year.

/s/ Dwight D. Eisenhower"



Wholesale Prices, September 1956

Catches in September 1956 of fish and shellfish were about normal for this period of the year. Seasonal declines for some East Coast varieties, light supplies of Pacific salmon, and the Pacific halibut fishery approaching the end of a drawn-out season were balanced somewhat by greater landings of shrimp. There was little change in the average wholesale price for all edible fish and shellfish during the

month. The September 1956 index (114.3 percent of the 1947-49 average) for all edible fish and shellfish (fresh, frozen, and canned) declined only 0.3 percent from August 1956, but was higher by 4.7 percent than for September 1955.

Landings of the leading fresh finfish in September declined. Compared with the previous month, wholesale prices for Great Lakes whitefish were up sharply and the market for fresh haddock, salmon, and halibut continued firm. The index for the drawn, dressed, and whole finfish subgroup in September was 1.1 percent above that for August and 6.1 percent above September 1955. The very high indexes for fresh-water whitefish and yellow pike in September 1955 were due to the strong Jewish holiday market occurring in that month, but were offset by the lower haddock, salmon, and halibut prices.

Although landings of large drawn haddock at Boston were relatively light this September, those of small haddock (which are usually filleted), were good. Wholesale prices this September for fresh drawn haddock and fresh haddock fillets held

Table 1 - Wholesale Average Prices and Indexes for Edible Fish and Shellfish, September 1956 With Comparisons										
Group, Subgroup, and Item Specification	Point of Pricing	Avg. F	rices <u>1</u> /	Indexes (1947-49=100)						
			Sept. 1956	Aug. 1956	Sept. 1956	Aug. 1956	July 1956	Sept. 1955		
LL FISH & SHELLFISH (Fresh, Frozen, & Canned)					114.3	114.6	114.6	109.2		
Fresh & Frozen Fishery Products:					125.8	126.5	125.9	113.8		
Drawn, Dressed, or Whole Finfish:					132,6		122.5	125.0		
Haddock, lge., offshore, drawn, fresh	Boston	lb.	.10	.10	100.1	101.3	92.2	58.5		
Halibut, West., 20/80 lbs., drsd., fresh or froz.	New York	1b.	.45	.44	139,2	136,9	122,2	133,1		
Salmon, king, lge. & med., drsd., fresh or froz.	New York	lb.	.68	.66	151.7	148.3	142.7	140.4		
Whitefish, L. Superior, drawn, fresh	Chicago	1b.	.61	.49	151.2	121.5	119.0	235.5		
Whitefish, L. Erie pound or gill net, rnd., fresh	New York	Ib.	.74	.65	149.6	131.4		222.4		
Lake trout, domestic, No. 1, drawn, fresh	Chicago	lb.	.58	.60	117.8	122.9	122.9	123.0		
Yellow pike, L. Michigan & Huron, rnd., fresh .	New York	lb.	.50	.55	117.3	129.0	126.7	211.0		
Processed, Fresh (Fish & Shellfish):					126,3	122,2	128.6	107.8		
	Boston	1b.	.29	.29	97.0	97.0	112.3	78.3		
Shrimp, Ige, (26-30 count), headless, fresh	New York	lb.	.72	.70	113.0	110.2	126.4	94.5		
Oysters, shucked, standards	Norfolk	gal.	6,00	5.75	148.5	142.3	136,1	129,9		
Processed, Frozen (Fish & Shellfish):					102.9	114.5	117.7	93.8		
Fillets: Flounder, skinless, 1-lb, pkg,	Boston	1b.	40	.40	103,4	103.4	102.1	102,1		
Haddock, sml., skins on, 1-lb. pkg	Boston	lb.	.28	.28	86,3	86,3	86,3	84.7		
Ocean perch, skins on, 1-lb, pkg	Boston	Ib.	.28	.28	110.8	110.8	109.8	108.8		
Shrimp, Ige. (26-30 count), 5-lb. pkg	Chicago	lb.	.64	.78	99.2	120.4	126.6	84.1		
Canned Fishery Products:					98,0	97.7	98.7	102.7		
Salmo, pink, No.1 tall (16 oz.), 48 cans/cs	Seattle	cs.	22.65	22.65	120.0	120.0	120.0	114.8		
Tuna, it. meat, chunk, No. 1/2 tuna (6-1/2 oz.), 48 cans/cs	Los Angeles	cs.	10.60	10,60	76,4	76,4	76.4	92.3		
48 cans/cs. Sardines, Maine, keyless oil, No. 1/4 drawn	Los Angeles	cs.	7.50	7.50	87.5	87.5	87.5	88.1		
(3-1/4 oz.), 100 cans/cs	New York	cs.	7.70	7.50	81.9	79.8	87.3	81.9		

1/Represent average prices for one day (Monday or Tuesday) during the week in which the 15th of the month occurs. These prices are published as indicators of movement and not necessarily absolute level, Daily Market News Service "Fishery Products Reports" should be referred to for actual prices.

steady at August levels. Prices at wholesale for fresh 26-30 count shrimp at New York were up slightly and the shucked oyster prices for the new season starting September 1 were about 50 cents a gallon higher. Higher shrimp and oyster prices boosted the September fresh processed fish and shellfish subgroup index about 3.4 percent above August. When compared with September 1955, the September 1956 prices for items in this subgroup were higher by 17.2 percent due to substantially higher prices for all the items in this subgroup.

Frozen fillet prices at the wholesale level were unchanged from August to September, but frozen shrimp prices at Chicago declined 17.9 percent. Prices for frozen shrimp normally start to decline in September due to greater catches of shrimp in the Gulf of Mexico. The rather sharp decline in frozen shrimp prices in September 1956 were probably not as drastic as the index indicates since part of the drop was attributed to the lack of the higher-priced white shrimp on the market during the pricing period. Primarily due to the lower frozen shrimp price, the index for the processed frozen fish and shellfish subgroup declined 10.1 percent from August to September, but was still 8.8 percent above September 1955.

There were no significant changes in canned fishery products from August to September 1956 except for a slight change upward in the wholesale price for canned Maine sardines. The late season pack of Maine sardines has not been up to expectations and the pack, although higher than in 1955, is still below average. The index for canned fishery products in September was only 0.3 percent above that for August, but 4.6 percent below September 1955. When comparing this September's canned fish prices with those for last September, canned tuna prices were substantially lower this year than last, and this more than offset the increases in the three other canned fishery products in this subgroup.



MOTION PICTURES CAN PROMOTE FISH SALES

Industry has found that the motion picture, used as a sales-promotion medium, reaches a great number of consumers in a relatively short period—at low cost as compared to most other advertising media. Food industries which are in competition with the fisheries, such as the meat and poultry industries, are making good use of motion pictures in their advertising campaigns. However the fishing industry is also realizing the important role of the motion picture in sales promotion, and fishery films produced by individual fish companies and through Government—industry cooperation are stimulating daily the demand for fishery products.

Reports received from television stations and the approximately 140 Fish and Wildlife Service film depositories indicate that several million persons a year see the commercial fisheries motion pictures produced and distributed by the Service.

The Service has a program whereby it will cooperate with any segment of the fishing industry desiring to finance the production and distribution of motion pictures. For example, the most recent reports received from Service film libraries show that a sound, color, 16mm. film produced about eight years ago by the Service, in cooperation with the Maine sardine industry, has been in constant distribution during those years and has had a larger audience every reporting period. This film has averaged about one television showing a week during these years and, in addition, about 300,000 persons see it each year by obtaining library prints. The effectiveness of the program is best evidenced by the fact that the Maine sardine industry is sponsoring a follow-up industry-Government film, cooperatively-produced, featuring the use of Maine sardines in hot and cold dishes. Similar films have been produced cooperatively with the shrimp, menhaden, and other industries related to the fisheries.

The Service fishery motion pictures are distributed free of charge to the public and, with the exception of the initial cost of production and the prints, the motion picture assistance is free of charge to the segments of the industry which sponsor the production of the film. Eleven fishery market development motion pictures are now in distribution and three are currently in production. Fishery Leaflet 255, entitled Fishery Motion Pictures, contains the titles and a description of each film as well as information as to how they may be borrowed free of charge. This leaflet may be obtained by addressing requests to the U. S. Fish and Wildlife Service, Washington 25, D. C.



International

BALTIC SALMON FISHERIES CONVENTION PROPOSED: A proposed convention to regulate salmon fisheries in the Baltic Sea was discussed informally between Swedish and West German government officials in Hamburg in July 1956. Only partial agreement could be reached. Germany objected to the institution of a closed season on the grounds of insufficient scientific evidence to prove its necessity, and because of fears of economic repercussions in the German salmon fishery, according to an August 29 report from the United States Consulate at Bremen.

In July 1956 two representatives of the Swedish government visited Hamburg to discuss unofficially salmon fisheries in the Baltic Sea with the West German Food Ministry.

Swedish fisheries are deeply concerned by the decline of salmon stocks in the Baltic Sea, in spite of their large-scale breeding efforts and the release of young salmon in these waters. Therefore, the Swedes are interested in establishing an international convention regulating catching techniques, minimum sizes, and a closed season. Sweden has already approached Denmark in this matter and wishes to include West Germany in the proposed convention.

It was found that with regard to catching techniques and the minimum size of the salmon to be caught an agreement could be reached relatively easily. However, West German opinions about the necessity and extent of a closed season differed widely from those entertained by the Swedes. West German experts assert that scientific data concerning salmon stock development in the Baltic Sea are not sufficiently complete to warrant such a step, the more so since it would have considerable repercussions on West German salmon fishery activities. The proposed closed season, which would last from December 20 until February 28, would probably cut the West German salmon catch to about half of its present volume. German fishery experts see no way of compensating such a loss.

In view of these facts it was agreed to suspend the problem of a closed season for the Baltic salmon fisheries. The Copenhagen headquarters of the International Council for Marine Research will be asked to conduct a thorough investigation of salmon stocks, their development, movements and all other questions involved. The Council's findings and final report will serve as a basis for further talks.

1/ According to the Bulletin Statistique of the Conseil Permanent International your l'Exploration de la Mer, volume XXXVIII/

According to the Bulletin Statistique of the Conseil Permanent International pour l'Exploration de la Mer, volume XXXVIII 1953, salmon catches in 1953 amounted to: Denmark 753 metric tons, Sweden 413, Finland (incl. trout) 350, West Germany 75; total catch 1,591 metric tons,

AGREEMENTS

ICELAND AND CZECHOSLOVAKIA AMEND 1954 TRADE AGREEMENT: Iceland and Czechoslovakia on August 14, 1956, signed a new annual Protocol to their Trade Agreement of 1954. It is beleived that total exports to Czechoslovakia will be about 25 percent over 1955 and 61 percent over 1954. Imports are expected to be 13 percent over 1955 and 51 percent over 1954. The volume of fishery products to be exported from Iceland will be 30 percent higher in 1956/57 then for the preceding year and 53 percent higher than in 1954/55. The table gives the exports since the agreement was made.

Icelandic Exports of Fishery Products Under Iceland-Czechoslovakia Trade Agreement									
Product		FY1955/56							
	(Metric Tons) (US\$1,000)								
Fish fillets, frozen	7,000	8,000	6,000	2,760	2,854	2,140			
Herring, salted and frozen	3,500	1,000	2,000	500	185	369			
Fish meal	2,000	1,000	500	360	154	77			
Fish oil	500	-	-	111	-	-			
Total	13,000	10,000	8,500	3,731	3,193	2,586			

The figures in the table do not include frozen fillets and fish meal to be shipped to Czechoslovakia to service and repay the credit granted for purchase of hydroelectric machinery early in 1956.

Note: Values converted at the rate of 44,21 Czech crowns equal 100 Icelandic kronur and 1 Icelandic kronur equals US\$0,0615.

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ITALY AND YUGOSLAVIA SIGN AGREEMENT ON FISHING IN THE ADRIATIC: The lack of a fishing agreement has been a source of irritation and incidents, with the Yugoslavs impounding Italian fishing boats when caught fishing in Yugoslav waters. An agreement permits Italian fishing from September to April in certain zones of the Adriatic near the Pelagruz and Kajol islands, westward to the island of Viz and near the Jabuka and Kamik islands. Along the upper part of the west coast of Istria, 35 "stationary" Italian vessels are to be permitted to fish from November to April at a distance of four miles from the Yugoslav coast. The Yugoslav sea area which is now open to Italian fishing vessels is almost one-half of the area fixed under the 1949 agreement and Yugoslav waters are completely protected along the entire sea board for a distance of 10 miles from the coast with the exception of the areas included in the agreement; (in addition to 6 miles of territorial waters there is also a 4 mile protective belt). The agreement extends only to October 1957, so that with most of the 1955/56 season passed it involves little more than one full season. However, prospects exist that the fishing agreement will be extended for an additional year, points out a March 12, 1956 dispatch from the United States Embassy in Belgrade. The agreement also provides for a joint fishing zone in part of the Trieste gulf, the possibility of Italian purchases of fish from Yugoslav waters, and proposes joint efforts in developing deep sea fishing.

GENERAL AGREEMENT ON TARIFFS AND TRADE

11th SESSION IN GENEVA: Recent developments in the economic field will be reflected in discussions at the eleventh session of the Contracting Parties to the General Agreement on Tariffs and Trade (GATT) which opened in Geneva October 11, 1956.

For example, proposals for the establishment of a common market or customs union for Benelux, France, the Federal Republic of Germany, and Italy are now being studied in Brussels. In Paris, a working party established by the Organization for European Cooperation (OEEC) is examining the possibility of creating a free-trade area to include the countries forming the proposed customs union and other OEEC member countries. The Contracting Parties will be concerned as to the obligations under the GATT of member countries of GATT which decide to participate in any such customs union or free-trade area.

It has been proposed that there should be a general opportunity for consultations among GATT parties on the quantitative import restrictions which they are still maintaining for balance-of-payments reasons. At this session plans for such consultations are likely to be drawn up, but the actual consultations would be started at a later date. During the session the customary consultations with certain countries on the discriminatory application of their import restrictions will be held, and developments in the OEEC's trade liberalization program will be reviewed.

Switzerland, which is not now covered by the GATT, has signified its intention to apply for accession to the General Agreement, and this request will be discussed during the session.

In the field of customs tariffs there will be an examination of questions likely to arise if the new Brazilian customs tariff is approved by the Brazilian Congress. Other questions related to customs administration will also be studied.

The Contracting Parties will examine reports received on the functioning of the waivers from specific GATT obligations that have been granted to certain countries from time to time. A short list of complaints of violations of obligations will be dealt with under the appropriate GATT procedures. The position of Japan visarvis the 14 contracting parties which are not undertaking GATT obligations toward her will also be reviewed.

In the field of commodity trade, the Contracting Parties will consider the present position on the proposed establishment of an international agreement on commodity arrangements and the possibility of any alternative approach to the question of commodity trade. Developments during the past year in the disposal of surplus agricultural products will be reviewed.

It is expected that representatives will be present from about 50 countries, including 35 GATT parties and observer governments; in addition, about 8 intergovernmental agencies will be represented.

The 35 parties to the General Agreement on Tariffs and Trade--which provides a code of fair-trade rules for nations accounting for 80 percent of world commerce-are: Australia, Austria, Belgium, Brazil, Burma, Canada, Ceylon, Chile, Cuba, Czechoslovakia, Denmark, Dominican Republic, Finland, France, German Federal Republic, Greece, Haiti, India, Indonesia, Italy, Japan, Luxembourg, Netherlands, New Zealand, Nicaragua, Norway, Pakistan, Peru, Federation of Rhodesia and Nyasaland, Sweden, Turkey, Union of South Africa, United Kingdom, United States, and Uruguay.

FOOD AND AGRICULTURE ORGANIZATION

MODERN DIVING AIDS MAY INCREASE SHELL PRODUCTION: Modern diving aids (such as goggles, swim fins, exposure suits, and underwater breathing devices) may help increase the production of trochus and mother-of-pearl shells in the Red Sea, if the recommendations made in a report to the Government of Sudan by the Food and Agriculture Organization (FAO), Rome, are adopted.

Such aids, states the report, could, if the fishermen were thoroughly trained in their use, "increase their efficiency and bring under exploitation untouched shell beds beyond the depth of 30 feet, which is the practical limit of present diving activities."

This is only one of a lengthy list of recommendations contained in the report. Others are concerned with the improvement in boats, gear and methods, handling of fish, government activity, training of personnel, etc. Specifically, they cover the use of deep water lines, net fishing in shallow water, multiple trolling with artifical lures, fishing with lights at night, using floating long lines, set long lines, nylon drift nets and trammel nets, and a plan of work for a FAO expert to take up in the Sudan.

The report, on the basis of a brief reconnaissance survey made in July 1955, also includes drawings and specifications for an improved mechanized felukka.

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NEW DIRECTOR GENERAL ELECTED: Shri B. R. Sen, Ambassador of India to Japan, was elected Director-General of the Food and Agriculture Organization (FAO) on September 20, after two ballots by the 74 member

nations failed to produce a majority September 18.

FAD

Before the vote was taken, the United States nominee, John H. Davis, Director of Program in Agriculture and Business at Harvard University Graduate School of Business Administration, announced that he had withdrawn from the race.

Assistant Secretary of Agriculture Earl Butz, who is the United States representative at the FAO conference, said that the United States would abstain from voting in the third ballot,

and that no attempt would be made to influence those who previously voted for Davis. He said his government had the fullest confidence in the remaining candidates, and pledged full United States support to the new Director-General.

Ambassador B. R. Sen said at a press conference September 20 that he will return to Rome about the end of November 1956 to take office as FAO's Director-General.

He told correspondents that the less-developed areas of the world, in both hemispheres, "need special attention," and that FAO's work will be in that direction "without neglecting the work which is being done in the more-developed areas."

The 74-member body adopted the report of the Council, the 24-nation group which conducts the Organization's business between regular sessions of the Conference, and adopted a Cuban resolution expressing its confidence that the new Director-General will be able to find a solution to existing internal problems.

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WORLD FISH PRODUCTION RISING: Continued progress in mechanizing fishing boats and gear and in improving the marketing of fish and fish products in underdeveloped countries is forecast by the Food and Agriculture Organization (FAO) in a chapter on world fisheries in the FAO report on "The State of Food and Agriculture 1956."

The report, published early in September 1956, contains a comprehensive survey of the world food situation. The chapter on "World Fisheries; General Trends and Outlook With Examples from Selected Countries," deals with production, consumption, utilization, trade, technical development, government fishery policies, etc., and cites specific examples from Japan, Norway, Iceland, United Kingdom, Germany, United States, Canada, Union of South Africa, and South-West Africa. A section is devoted to the situation in the more-developed and the less-developed fisheries.

Amont the interesting facts and figures quoted in the report are those concerned with world production of fish, crustaceans, mollusks, etc., which has risen from about 22 million metric tons in 1938 to "a level ranging between 27 million and 29 million tons in the years 1952 to 1955."

Six of the world's biggest producers--China, Japan, Norway, United Kingdom, United States, and U.S.S.R.--account for about 50 percent of the world's total production, while seven other countries--Canada (including Newfoundland), France, India, Indonesia, Germany, Spain, the Union of South Africa (including South-West Africa)--account for about 16 percent of the world catch.

A few species of fish provide the bulk of the catch. For example, one-quarter of the grand total consists of herrings, sardines, anchovies, menhaden, pilchards, etc., "while the cods, hakes, haddocks, etc., account for approximately 4 million tons, i.e. about one-sixth of the total."

Although fish provide a natural rich source of animal protein, fish and fish products do not provide more than about 10 percent of the world's total consumption of animal protein. But this percentage varies according to the level of food consumption in various areas of the world.

"Even a low level of fish consumption represents the main part of animal protein intake in Indonesia, the Philippines, part of India, Thailand, and other countries," the report says, "while even a relatively high level represents only a small part of the animal protein intake in the United Kingdom, Germany, Norway, Denmark, etc. Japan and Iceland are exceptional cases where the main part of the animal protein intake is supplied from fish."

The report indicates that, with increased knowledge of stocks and resources and improvement in fishing boats, gear, and methods, world production of fish and fish products is likely to continue to increase and provide, perhaps, a more substantial part of the diet of people, especially in the less-developed countries.

GREAT LAKES FISHERIES COMMISSION

<u>FIRST ANNUAL MEETING</u>: The International Great Lakes Fisheries Commission, set up to direct sea-lamprey control, was scheduled to hold its first annual meeting at Ann Arbor, Mich., late in November.

The six-member Commission recently announced it will receive approximately \$1 million to begin its work. More than \$600,000 will be supplied by the United States Government and about \$300,000 will come from the Canadian Government. The Commission said these amounts represent the approximate ratio of water controlled by the two governments.

The Commission will make use of the research agencies of the two nations in granting funds for research, according to James W. Moffett, who serves as temporary Executive Secretary of the Commission.

"We will continue with the electrical barrier defense against the sea lamprey," Moffett said, "and will continue working on the 'selective poisons' that are still in the laboratory state."

NORTHWEST ATLANTIC FISHERIES COMMISSION

NORTHWEST ATLANTIC FISHERIES TRENDS, FOR FIRST PART OF 1956: News from the Northwest Atlantic Convention area indicates that fishing was in general better this year than a year ago, according to the September 1, 1956, Newsletter from the International Commission for the Northwest Atlantic Fisheries.

Canada: Statistics for the Canadian Atlantic fishery for the first five months of 1956 as compared to the same period last year show a very small increase (3 percent) in cod landings. However, a very considerable increase (about 40 percent) in haddock landings was reported, due principally to increased landings in Newfoundland, but the Nova Scotian landings also show a considerable increase. The ocean perch landings decreased about 30 percent.

<u>Denmark</u>: The Danish factory vessel <u>Greenland</u> is in West Greenland waters this year producing fillets of cod, halibut, and wolffish, for direct export from Greenland to the United States. The production this year is reported to be somewhat higher than the previous year.

A fishing vessel from a Danish home port (Esbjerg) is fishing cod off West Greenland waters this year. The last year that vessels from Danish home ports (apart from the factory vessel <u>Greenland</u>) fished at West Greenland was in 1951.

Norway: Several of the Norwegian vessels which have been fishing in West Greenland waters this summer have returned to Norway. The fishery is reported to have been better than in 1955.

<u>Portugal</u>: Some of the Portuguese trawlers fishing on the Grand Banks returned to Portugal with full cargoes. In general the trawlers caught more cod this year than in 1955. The Portuguese liners also reported good catches. Some are reported to have caught within the same period about double their catch in 1955.



Argentine Republic

EAST GERMAN TRADE AGREEMENT WITH ARGENTINE FISH INDUSTRIES AND COOPERATIVES: According to a West German trade journal publication (Allgemeine Fischwirtschaftszeitung, Bremerhaven), the Government of the German Democratic Republic has prepared a trade agreement with an Argentine group of fish industries and cooperatives in Mar del Plata. The agreement will be valid for a period of five years. The total value of the commodities involved will amount to 500 million pesos (about US\$66 million).

Under this agreement the contracting Argentine industries will supply to the German Democratic Republic among other things 20,000 metric tons of fish meal, 2,000 tons of "merluza" (dried cod), 50 million cans of sardines, 50 million cans of mackerel, and other types of canned fish. In return the German Democratic Republic will supply fishing gear in the value of 300 million pesos (US\$40 million). These supplies will include 30 medium-size trawlers, 50 motor vessels for coastal fisheries (both types equipped with modern navigation instruments including radar), nylon fish nets, electrical sounders, radiotelegraphic equipment, refrigeration plants for canning factories, refrigerated trucks, machinery for cod drying, and several complete fish-meal plants. Further, tools for fish processing, packing material, and machinery for fish canning will be supplied.

Similar agreements are reportedly being negotiated between Argentina and Hungary and Argentina and Czechoslovakia, reports the United States Consulate at Bremen in an August 29, 1956, dispatch.



Australia

<u>DEVELOPMENT OF FISHING INDUSTRY IN PAPUA AND NEW GUINEA PLAN-NED:</u> A plan to develop the fishing industries of Papua and New Guinea was announced on August 23 by the Australian Minister for Territories. At the present time the commercial fisheries are underdeveloped, according to a September 13, 1956, dispatch from the United States Embassy in Canberra.

The aims of the Australian Government are to increase shell production and exports, to reduce imports of fish and, eventually, to export fish.

The main points of the plan, which will be implemented by the Division of Fisheries of the Territory Department of Agriculture, Stock and Fisheries, are:

(1) Introduction of improved fishing techniques to native fishermen, including distribution to them of fishing gear; (2) The training of native fishermen ashore and as crews of Administration vessels in all aspects of fishing; (3) Encouragement of indigenous people to organize their activities to increase their consumption and trade in fish; (4) The recruitment and training by the Administration of indigenous people as Native Fishery Assistants to be established in appropriate areas to assist native fishermen.

Commercial fishing enterprises by European and native fishermen would be encouraged where they would not conflict with village communities dependent on fishing. A marine biological station would be established when appropriate to support all aspects of the fisheries development plan.

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JAPANESE PEARL-SHELL FLEET OPERATES OFF NORTHERN AUSTRALIA: A Japanese pearling fleet is again operating in the northern waters of Australia this season.

The Australian Minister for Primary Industry said the fleet comprised one mothership, 21 luggers, and one Government inspection vessel. The Japanese will conform to the conservation regulations laid down under the Pearl Fisheries Act. The Commonwealth Government fixed the same maximum take as last year-1,000 tons of mother-of-pearl shell.

The Japanese vessels are allowed to operate in the waters of the Northern Territory Division outside a 10-mile radius of the mainland and inhabited islands. One particular area, however, is reserved for Darwin-based fleets and maximum catch limits are fixed for two other defined areas. The Japanese are also allowed to operate in two subareas of the Western Australian Division over 120 miles north of Broome and beyond 10 miles from the mainland or an inhabited island, and not normally worked by Australian pearlers (Fisheries Newsletter, July 1956).

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<u>NEW CARGO SHIPS TO INCREASE REEFER SPACE</u>: United States importers of Australian shrimp and tuna will be interested in the improved refrigerated freight facilities to North America which will become available when the two Matson ships, Monterey and Mariposa enter service.

The first ship is scheduled to leave San Francisco in October 1956. They will call regularly at Los Angeles, which will save Australian tuna exporters the present road or rail haul from San Francisco. Sydney will be the normal Australian terminal, but the ships will call at Melbourne four times a year.

Each ship will have 30,254 cubic feet of reefer space and will be equipped with modern handling gear, including conveyors running cargo direct into the reefer holds. The ships will call at Pago Pago, where one of America's largest tuna packers operates a cannery.

The freight rate for raw tuna is US\$3.85 a 100 pounds, but shrimp come under the general reefer rate of US\$64.90 per 40 cubic feet to either the western or eastern coast of America.

The shipping firm owns four of the leading hotels in Hawaii which are reportedly anxious to make shrimp and lobster a regular feature of their hotel and shipmenus. They have been pleased with the flavor of Australian shrimp.

From Brisbane there are reefer ships for the United States by two shiplines. These ships run to the North American east coast (<u>Fisheries Newsletter</u>, July 1956, published by the Australian Commonwealth Director of Fisheries).

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PROGRESS IN QUEENSLAND SHRIMP FISHERY: Recent advances made by Queensland in the catching, packing, and export of shrimp are reviewed in an article by D. H. Plucknose, Secretary, Queensland Fish Board and published in the July 1956 issue of <u>Fisheries Newsletter</u> of the Commonwealth Director of Fisheries. The article states that in 1956 upwards of 60 boats were engaged in the fishery for banana shrimp in the Hervey Bay area (about 180 miles north of Brisbane on Australia's East Coast).

The Queensland Fish Board has provided a two-way radio station at its market at Bundaberg. In addition, a new jetty has been constructed, and special facilities provided for processing workers.

The purpose of installing the radio transmitter was to provide two-way communication between the Fish Board market and vessels so that advance notice of the catch can be obtained prior to landing to allow for more efficient use of the facilities of the port. It was considered also that with the cooperation of boat crews, congestion at the wharf could be avoided.

By arrangement between the Fish Board, Brisbane Weather Bureau, and Post-master-General's Department, daily weather forecasts are telegraphed to Bundaberg for transmission from the Board's station for the benefit of fishing crews.

With the recent installation of the Board's second snap-freeze unit (the most modern of its type in Australia) at Bundaberg, and on completion of work on the construction of a temporary factory at this center, it is proposed to undertake all the processing of locally-caught shrimp on the spot. This will replace the method followed to date in which processing at this market has been confined to removing the heads, prior to icing the shrimp for railing to the Board's principal market in Brisbane for grading, packing, and freezing. Depending upon results achieved at Bundaberg this season, it is not unlikely that a modern permanent processing establishment will be erected there by the Board before next year's shrimp season begins.

With a view to establishing the shrimp industry in Queensland on a sound basis, the Fish Board in 1954 resumed control of shrimp. Following re-control, the Board in 1955 and again this year has offered the shrimp fishermen a stabilized price for their catch.

Present export requirements are for green shrimp which, with heads off, count no more than 40 to the pound. For green banana shrimp of the required size, delivered to its markets in first-class condition, the Board is paying 1s.10d. (about 20.5 U.S. cents) a pound heads on and 3s. (about 33.6 U.S. cents) heads off. These rates are, of course, subject to variation. The bulk of the green shrimp received by the Board this season to the time of writing have come from Bundaberg and Gladstone, although king shrimp in quantity are expected from the South Coast as the season progresses.

From inquiries made overseas it has been established that the white-meat banana shrimp (so named, though not altogether aptly, because its pale body and yellow legs have been likened to the popular fruit) compares favorably with shrimp supplied to United States markets from the Gulf of Mexico, and to United Kingdom and Continental markets from the Mediterranean and the Far East. It now remains to achieve a streamlined processing procedure which involves the least possible

handling of the product, and in which labor and overhead costs are reduced to a minimum, in order that Queensland shrimp may compete on overseas markets with those from cheaper-labor countries. The availability of machines from overseas for heading and grading is being explored.

In response to inquiries initiated by the Fish Board, numerous approaches have been made by overseas importing interests desirous of handling Queensland shrimp, including merchants in the United States, United Kingdom, South Africa, New Zealand, and Europe. The initial difficulty has been in securing firm offers of prices which, while covering the Board's processing and handling costs, would insure a reasonable return to the producer.

The availability of refrigerated shipping space also presents something of a problem. For example, there is no regular service from Queensland ports to the west coast of America, though fortunately there is a service to East Coast ports. It has not been practicable to anticipate the rate at which shipments could be effected, since a full shipment can only be built up over a period, depending on available catches. The stockpiling of frozen seafoods against possible shipment at a later date is a doubtful proposition.

In forwarding initial trial consignments to both the United Kingdom and the United States, a pack consisting of 4 pounds of cooked shrimp, snap-frozen in a small block of ice, was used, the gross weight of the pack being 6 pounds. This pack was designed essentially to meet the requirements of the catering trade, and was not attractively cartoned as it was not intended for display. From its reception in the United Kingdom it appears there is at least a possibility of establishing a market there for cooked Queensland shrimp. However, the more lucrative dollar-earning American market prefers green shrimp for cooking in a manner to suit the taste of the consumer. The first sizable consignment exported by the Fish Board comprised uncooked, headless shrimp destined for the United States.

Early in June the <u>Pioneer Glen</u> left Brisbane with a cargo of 13,600 pounds (272 cartons) of headless raw-frozen banana shrimp; purchased, processed and packed by the Fish Board, it was scheduled to reach United States markets in midJuly. The bulk of the consignment was offered in New York, but also included was a small sample addressed to Baltimore. Token shipments of cooked shrimp had previously been forwarded to Philadelphia and Los Angeles. Trial packs of green shrimp were recently air-freighted to Chicago, and single-pack samples have been made available to Australian agents for forwarding to their principals in the United States. Thus the American market is being probed at different points to obtain an indication of the most profitable outlets for Queensland shrimp.

The shrimp recently exported were layer-packed in attractively-printed waxed cartons, each holding 5 pounds. The cartons carry the Board's newly-adopted trade brand and each proclaims its content a product of Australia. Ten of these 5-pound cartons are packed in a master carton for shipping. Layer-packing is necessary to meet the requirements of the United States market generally, and each carton is designed to enable the species of shrimp packed in it and the count to be indicated by the packer.

It has yet to be established whether "wet" snap-freezing and cartoning after freezing is preferable from the point of view of processing economy and finished pack to bulk "dry" freezing in low-temperature cold rooms after packing into inner cartons. Glazing after freezing is, of course, desirable in both packs. This can be done by dipping the snap-frozen block before cartoning, or in the case of the pack frozen in the carton by spraying the surface. There appears little doubt that both types of pack are acceptable in the United States. The shrimp shipped by the Board on the Pioneer Glen had been "dry" frozen after packing.

There does not appear to be a firm demand at profitable prices in the United States for shrimp counting more than 40 to the pound with heads off, and the export pack has so far been confined to four grades: 15-20, 21-25, 26-30, and 31-40 count to the pound. The bulk of the banana shrimp packed by the Board so far this season (to the end of May) has been within the 21-25, 26-30, and 31-40 count, with approximately 25 percent more in the 26-30 range than in each of the other two counts. The United States importer prefers the banana shrimp to the tiger shrimp as the stripes of the uncooked tiger are considered unattractive.

There are at least three channels through which the Australian shrimp exporter can reach the United States market. He can sell through an American broker who acts as an agent handling sales to United States merchants and distributing houses on a commission basis. Alternatively, he may prefer to ship through an Australian exporting agent, or to negotiate direct with American fish-handling companies. It has been reported that certain Australian exporting interests are prepared to offer "f.o.b. Australian port" prices for shrimp and this outlet has its advantages to the processing organization in that the exporter accepts the hazards associated with overseas marketing. The merits of selling through a United States broker on a commission basis lie in the fact that the exporter gains the benefit of any increase in United States market prices which may occur when his shrimp are sold. Conversely, his return could be lower than expected should a slump in the market occur.

In addition to the purchase price paid to the fishermen, the Queensland Fish Board has undertaken that, after allowing for its costs, any profits accruing from the export of shrimp will be returned to the fishermen, to be shared on a pro rata basis according to the quantity of shrimp received by the Board from each supplier. Note: Also see Commercial Fisheries Review, October 1956, pp. 53 & 54.

WHALING SEASON IN 1956 EXPECTED TO EXCEED 1955 IN VALUE: In 1956 Australian whaling is expected to produce whale products estimated to be valued at over AL2 million (about US\$4.5 million) derived from the 1956 quota of 1,990 humpback whales. The 1955 whaling season yielded 15,876.3 tons of oil from 1,840 humpback whales. Assuming that the whalers catch whales of similar oil yield in 1956 as in 1955, it is estimated that 16,956 metric tons of oil will be produced.

The world price (about 98,000 metric tons of 1956 Norwegian Antarctic whale oil were sold for about US\$238 a long ton) for whale oil is higher in 1956 due to reduced Antarctic quotas, states the Fisheries Newsletter (July 1956) of the Commonwealth Director of Fisheries. The estimated 1956 Australian production of 16,956 tons of whale oil at US\$247 a ton will be worth almost US\$4.2 million, an estimated yield of 7,000 tons of meal and solubles at US\$100 a ton will bring a total of US\$700,000.

Note: (1) Australian pounds converted to US\$ at the rate of \$2,241 equal AL1.

(2) Also see Commercial Fisheries Review, May 1956, p. 39.



Canada

ANTIBIOTICS APPROVED FOR FISH PRESERVATION: It was announced on October 1, 1956, that the Canadian Department of National Health and Welfare approved the use of antibiotics in the preservation of freshly-caught fish. The drug Acronize," a derivative of aureomycin, will be added in small amounts to the ice used on board fishing vessels and for the inland shipment of fish and is expected to greatly retard spoilage.

According to the United States makers of "Acronize," the drug is under consideration by United States authorities for use in fish preservation. Until approved by these authorities, however, it is understood that fish preserved by antibiotics may not enter United States markets, states an October 5 dispatch from the United States Embassy in Ottawa. "Acronize" has already been approved in the United States for use on poultry.

A survey conducted between 1937 and 1950 by the Fisheries Research Board of Canada showed that 40 percent of the ocean fish reaching consumers in Toronto, Montreal, and Ottawa had lost their original fresh taste and appearance, though still regarded as edible, points out the October 8 Oil, Paint, and Drug Reporter.

A test in 1954 on 4,000 pounds of cod and haddock fillets shipped 1,000 miles from Halifax to St. Catharines, Ont., in July and August revealed that the most important single thing influencing the quality of such fillets in distant retail markets is the storage period of the fish at sea.

Because it is impractical, and economically speaking impossible, to cut the time during which the fish is stored at sea, scientists at the Canadian Fisheries Experimental Station, Vancouver, B. C., began a search in 1943 for a way to halt the bacterial spoilage of fish aboard ship.

Dr. Hugh L. A. Tarr pioneered research in adapting antibiotics to the role of keeping fish fresh longer. His first tests showed that the antibiotic penicillin was without value for this purpose. As other antibiotics became available, the testing went on. By 1950 Dr. Tarr could see promise in the field and in 1955 he concluded that "Aureomycin" was five times more effective in retarding food spoilage than any other antibiotic available.

The major benefit of "Acronize," therefore, will be to reduce drastically the high deterioration factor in the fishing industry. Not only will it extend the storage life of fish aboard ship, but it will allow the fishing vessels to range farther out to sea to tap new unexplored schools of fish.

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FISHERMEN'S INDEMNITY PLAN: On July 6, 1956, the Fishermen's Indemnity Plan of the Department of Fisheries of Canada completed three years of operations. On that date a total of 3,442 vessel policies were in force, representing a total appraised value of C\$7,667,186. Growth during the third year represented

Canada's Fishermen's Indemnity Plan For Vessels												
Province	Vessels Insured at July 6, 1956			Net Increase in Underwritings During Year Ended			Losses Paid During Year Ended July 6, 1956					
1					July 6, 1956		Total		artial		Both	
	No.	Approx.	Value	No.	No. Approx. Value		Value	No.	Value	No.	Value	
		C\$			C\$		C\$		<u>C</u> \$		<u>C</u> \$	
Newfoundland	946	1,013.	058	142	8, 241	31	25,999	29	6,191	60	32, 190	
Nova Scotia	835	1,327,	951	221	329,021	10	4,947	4	2,287	14	7,234	
New Brunswick	118	213,	693	25	35,540	-	-	-	-	-	-	
Prince Edward Is	168	154,	334	62	58,895	6	2,647	1	149	7	2,796	
Maritimes	1,121	1,695,	978	308	423, 456	16	7,594	5	2,436	21	10,030	
Quebec		266,	850	46	50,050	18	6,723	8	1,490	26	8,213	
Atl, Coast		2,975,	886	212	481,747	65	40,316	42	10,117	107	50, 433	
British Columbia .	1,039	4,691,	300	390	1,942,043	10	20,996	8	5,216	18	26, 212	
CANADA	3,442	7,667,	186	602	2,423,790	75	61,312	50	15,333	125	76,645	

602 vessels, valued at C\$2.4 million. During the year, 75 total-loss claims were paid amounting to C\$61,312 and 50 partial-loss claims amounting to C\$15,333; total indemnities were C\$76,645. The insurance in force represents annual premiums of C\$76,672. During the fiscal year just closed actual premium revenue amounted to C\$72,000 for the country as a whole.

As in the past, the experience in British Columbia was particularly satisfactory in the 12 months ending July 6. There was a net increase of 390 policies in that Province valued at C\$1,942,043 while indemnities paid included 10 total losses for C\$20,996 and 8 partial losses for C\$5,216. In that Province the indemnity rate for total losses was raised from 60 to 70 percent of appraised value and the deductible in the case of partial loss was reduced from 30 percent to 15 percent.

In the Atlantic Coast provinces the total number of insured vessels increased by 212 to reach 2, 403 on July 6 valued at just under C\$30.0 million. During the year 65 total-loss claims were paid in this area totaling C\$40,316 and 42 partial claims were settled for C\$10,117.

The present volume of business has been achieved without increasing administrative costs, which while high to provide coastwide coverage, now represent only about 2.5 percent of total appraised value. In the next year it is believed that this figure will drop to 2 percent as volume expands,

In addition to the direct benefits to those fishermen who have suffered total or partial losses, the Plan has made possible the introduction of guaranteed loans to fishermen under the Fisheries Improvement Loans Act, thus reducing interest costs to the fishermen. At the same time commercial insurance rates on fishing vessels have also been reduced, reports the July 1956 <u>Trade News</u> of the Department of Fisheries.

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FISH STICK PLANTS ORDERED BY RUSSIANS: According to press reports, the Soviet Fisheries Minister announced at a farewell press conference in Ottawa on September 18 that orders had been placed with a firm in Toronto for C\$4-5 million worth of fish stick plants. The announcement was made at the end of a threeweek tour of Canada by the Soviet fisheries delegation headed by Minister Ishkov.

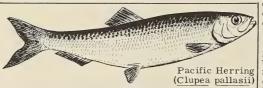
The fish stick plants, at a cost of about C\$380,000 each, will consist of complete processing equipment from the machine that handles the frozen blocks down to the frozen packaged product. The first complete plant is expected to be delivered in about six months. The others will follow subject to modifications to meet Soviet requirements.

Negotiations are under way with other Canadian firms for other types of fishprocessing machinery and refrigeration equipment. In addition, the Soviets are interested in buying a fleet of trawlers built along the lines of a new experimental trawler under construction in British Columbia, according to a dispatch dated September 21 from the United States Embassy in Ottawa.

* * * * *

REVIEW OF 1956 HERRING FISHERY IN BRITISH COLUMBIA: Because of the phenomenal catch of 92,067 short tons in the Queen Charlotte Islands, the British Columbia herring industry experienced a record season, according to a report ("Amount of Herring Spawn Deposited in British Columbia Coastal Waters in 1956") by the Fisheries Research Board of Canada Pacific Biological Station at Nanaimo. Over 250,000 tons of herring were caught and processed. In spite of the loss of potential spawners due to the fishery, the most serious being in the south central subdistrict, it is considered that sufficient fish either escaped the fishery or other schools moved inshore after the close of the fishing season to maintain an adequate spawning population in all subdistricts to insure the maintenance of the fishery.

During the past four seasons, the data suggest that while spawning populations have been consistently decreasing in three regions, they have been increasing in the two main west coast of Vancouver Island fishing regions. Such changes in population abundance are probably due, however, to variations in the relative strengths



of the contributing year-classes rather than to "overfishing" or "underfishing."

Pacific herring (<u>Clupea</u> <u>pallasii</u>) spawn in shallow water along the shoreline. The majority of eggs are deposited on vegetation, in or just below the intertidal zone, i.e.,

between the high and low-tide levels. Spawning grounds may vary in size from a few yards to several miles, the length and width being largely determined by the distribution of the vegetation and the stage of the tide at time of spawning. The spawning grounds are not randomly distributed along the coastline but are found in certain preferred regions year after year.

The measurement of the extent and intensity of herring spawnings along the British Columbia coast is carried out annually by officers of the Canadian Department of Fisheries. Members of the Biological Station, Nanaimo, B. C., carried out more detailed spawn surveys in the west coast of Vancouver Island subdistrict from 1946 to 1954 and in the lower and middle east coast of Vancouver Island subdistricts in 1955 and 1956.

The maintenance of an adequate spawning stock in each of the major herring populations is essential to insure the perpetuation of the fishery dependent upon them. Estimates of the amount of spawn deposited in any area form an index of the size of the spawning stock and of the initial size of the new year-class. As spawning begins shortly after the close of the fishery, natural mortality in the intervening period will be negligible, and the estimate of the spawning stock will thus represent the escapement from the fishery.

In 1956, 188.1 statutory miles of spawn were recorded in British Columbia coastal waters, a reduction of about 13 percent from the 1955 level. In only two of the eight subdistricts (the upper east and west coast of Vancouver Island) was there an increase in extent of spawn over the previous year.

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TERRITORIAL SEA LIMIT OF 12 MILES ADVOCATED: The Canadian Government intends to claim the Gulf of St. Lawrence and similar bodies of water on Canada's coasts as Canadian territory, reports the Canadian Globe and Mail of August 17, 1956.

Officials said that international recognition of the claim will be sought at the U. N. General Assembly this fall. The assembly is expected to deal with the thorny problem of the limits of territorial waters.

The Canadian Prime Minister told the Commons on July 30 that the Government feels the present three-mile territorial limit of Canada should be extended to 12 miles offshore.

Authorities said that besides this the Government will claim as Canadian territory the Gulf of St. Lawrence, Hecate Strait between the Queen Charlotte Islands and the British Columbia mainland, and several bays, sounds, and gulfs, in the Arctic archipelago.

Historic fishing rights enjoyed by other countries along Canada's coasts would have to be recognized, the Prime Minister said.

The claim will not involve Hudson Bay or Hudson Strait, long recognized as Canadian territory though the entrance to them--between the northern tip of Labrador and Resolution Island--is about 32 miles wide.

Canada has never officially claimed the Gulf of St. Lawrence as Canadian territory. A 1937 government order-in-council defined the territorial limit in the St. Lawrence Estuary as a line running from Cape Rosiers on the Gaspe Peninsula to the western end of Anticosti Island and then north to the Quebec mainland.

The Prime Minister has indicated that Canada wants the territorial limit to be measured from a line running from headland to headland rather than following the sinuosities of the coast.

If this plan were followed--it was approved by the International Court of Justice in a case involving Norway several years ago--Canada could claim as its territory waters west of a line running from Cape North, N.S., to Cape Bay, Newfoundland. Cabot Strait at this point is 70 miles wide,



Chile

TERRITORIAL WATERS CLAIMS POSITION MAINTAINED: The Chilean Foreign Minister, in a press interview during his stay in Ecuador as chief of the Chilean delegation to the inauguration of Ecuador's new President, made the following statement: "I believe that the three countries (Chile, Ecuador, Peru) must jointly maintain their position in defending the wealth of their seas; to obtain recognition of their sovereignty over the marine wealth and to exploit it, and if others must be permitted to take advantage of that wealth it must be with the authorization of the coastal countries. In this matter the Foreign Offices (of the three countries) are in agreement."

The Chilean Foreign Minister stated that the position of the United States is one of a general character and that the United States is always ready to continue discussing the problem in harmony with the other countries. He also said, "We are always ready to enter discussion on a plane of harmony and cordiality."



Ecuador

CONVERSION REQUIREMENT INCREASED ON SHRIMP EXPORT EARNINGS: The amount of earnings from shrimp exports which Ecuadoran shippers must convert into sucres at the Central Bank's official rate of 15.00 sucres to the United States dollar has been increased by Monetary Board Regulation No. 178, dated August 16, 1956.

Under the new rule, US\$300 a metric ton must be converted at the official rate, compared to US\$100 in the past. The \$100-formula remains in effect for all other fish exports. The regulation is pursuant to an Emergency-Decree Law, promulgated in the Official Register of June 30, 1956, which modified the basic fishing law to permit the Monetary Board to require the conversion of up to the entire amount of earnings from fish exports at the official rate of exchange.

The new regulation will mean a drop in earnings of approximately two U. S. cents a pound for national shrimping companies, most of which are owned by American interests. Since shrimp is currently reportedly selling for around US\$1,400 a ton (about 63 U. S. cents a pound), they are still able to retain the bulk of their earnings or to convert them at the broker's free market buying rate (which averaged approximately 18.55 sucres to the dollar during July 1956). However, the companies indicated several weeks previous that any substantial increase in the conversion requirement might put them out of business. The Monetary Board, concerned with the weakness of Ecuador's monetary reserves, and responding to an appeal from the Ministry of Economy's Director of Fisheries, nevertheless has taken a step toward putting the infant fish industry more nearly on a par with other exports, according to the United States Embassy at Quito in an August 22, 1956, report.

Formosa

SHRIMP FISHERIES: Taiwan's shrimp and prawn production for 1955 amounted to 3,211 metric tons compared with 2,027 tons in 1952, 2,473 tons in 1953, and 1,987 tons in 1954. Local production is characterized by small-scale operations conducted by numerous independent producers, according to a United States Embassy report (March 6, 1956) from Taipei.

Approximately 28 percent of the 1955 catch resulted from coastal fishing operations, which involve the use of sail or manpowered sampans which catch shrimp of less than $2\frac{1}{2}$ inches (heads on) in length. Catches from deep-sea and inshore fisheries, which utilize motorized vessels ranging in size from 10-100 tons, accounted for 45 percent of the 1955 catch and consisted primarily of shrimp of about $2\frac{1}{2}$ inches in length. Output of cultured prawns, averaging 5 inches in length, accounted for the remaining 17 percent of the total production. The predominant cultured prawn species are Penaeus japonicus (Bates) and others of the same genus, while most of the shrimp caught consist of edible kinds of the Macrura family.

The most common methods of catching shrimp include the use of set nets, gill nets, beach seines, and seine and swing-bell nets. The height of the shrimp season runs from March through May, though operations are conducted throughout the year. About two-thirds of the total catch is gathered in the warm tropical waters off the southwest coast of the Island.

Production is insufficient to meet local demand and imports of dried shrimp from Japan are resorted to in order to make up the deficiency. There have been no past exports of shrimp and little likelihood exists that this situation will be changed in the future as no abundant shrimp resources are known to exist.

Outside of some sun-drying by fishermen, no processing of shrimp is undertaken nor do facilities for any type of processing exist.



German Federal Republic

SYNTHETIC NET FIBER: Successful experiments have been conducted with a new low-cost synthetic fiber of the polyvinyl-alcohol group to replace cotton in the manufacture of gill nets used to catch herring in the West German lugger fisheries, points out an August 10 report from the United States Consulate at Bremen.

The Department for Nets and Net Materials of the West German Federal Fisheries Research Institute in Hamburg is investigating the suitability of polyvinylalchol fiber (this type of synthetic fiber is reported to be produced on a large scale in Japan where it is marketed under various trade names) in the manufacture of fishing nets. It was found that this fiber when submerged in water loses about 30 percent of the very high tensile strength it has when in the dry state. The Institute by experimentation has managed to eliminate this disadvantage by coating the fiber with a special type of iron-black that is also used to strengthen perlon nets.

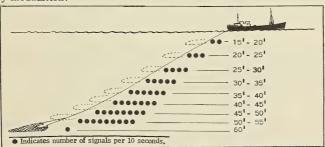
This achievement may prove to be of great practical significance since this rot-resistant fiber is reported to cost less than other types of synthetic fiber. In Germany the price of nets made of this synthetic fiber will probably be only slightly higher than those made of cotton.

The Institute is planning a large-scale test with gill nets made of this fiber for use in fishing operations during the 1956 herring season. The development may be of special benefit to the lugger fisheries which specialize in catching herring with stationary gill nets-so far made of cotton. To date the introduction of synthetic fiber nets in this industry has been unsuccessful because of the relatively high cost of the synthetic nets.

German deep-sea vessels use almost entirely trawl nets made of manila. Synthetic fiber nets, made primarily of perlon, a product similar to nylon, are being used only on a relatively small scale aboard trawlers.

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TELECOMMUNICATING DEPTH FINDER FOR MIDWATER TRAWL NETS: A new type of depth finder has been developed in West Germany to determine the movement of midwater trawl nets, points out a United States Consular dispatch (August 10) from Bremen. The device uses sound signals to indicate the depth at which the midwater net moves. Experts claim it to be an improvement over depth finders using frequency modulation.



Artist's conception of how depth measurements recorded by a conventional pressure meter attached to the ground rope of the trawl net are electrically transformed into sound signals and transmitted as such to the fishing vessel.

To make easier the adjustment of midwater trawl nets to the depth at which fish swarms have been located by echo-sounders, the German Federal Fish Research Institute in cooperation with industrial firms has developed a new device which is believed to be suitable in actual fishing operations.

The telecommunicating depth finder developed in West Germany uses the same principle as a somewhat similar United States device. It consists of a conventional pressure meter attached to the ground rope of the trawl net and measuring the

depth position of the net. These measurements are electrically transformed into sound signals and transmitted to the fishing vessel. Instead of employing frequency modulation to indicate the depth of the net, as does the United States device, the German apparatus uses groups of intermittent sound signals for various depths. It was found to be too difficult to produce Morse-code signals for this purpose. The oscillator therefore emits uniform signals of a steady frequency of 15 kc. with a speed of about three signals a second. Every period of 10 seconds from 1 to 10 signals are emitted to indicate the depth measured by the pressure meter attached to the trawl net. For example 2 signals per 10 seconds may indicate that the net is moving at a depth of about 15 to 20 feet, 3 signals at 20 to 25 feet, 4 signals at 25 to 30 feet, etc. When a depth of 60 feet has been reached, the series of signals start again with one per ten seconds. No difficulties were experienced in repeating the series of signals because the depth at which the trawl net moves can easily be determined within a tolerance of 60 feet.

The use of intermittent signals rather than frequency modulation seems to have definite advantages. The signals fortunately are for all practical purposes not affected by disturbances caused by the ship's propellor. This difficulty was reported to be one of the main obstacles in the development of the frequency-modulation method for commercial use. Recent tests conducted with the new device on board the research vessel Anton Dohrn showed an excellent reception of signals emitted from a trawl net towed with 375 fathoms of line at a depth of 450 feet.

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TRYPTOPHANE CONTENT OF FISH-MEAL PROTEIN BETTER INDICATOR OF NUTRITIVE VALUE: West German food scientists find that the tryptophane content of fish-meal protein may be a better indicator of the fish-meal's nutritive value than just the amount of protein itself, states a United States consular dispatch dated August 10 from Bremen.

In order to determine the nutritive value of dried shrimp, the Federal Research Institute for Fish Processing in Hamburg conducted a series of experiments with protein-starved rats. It was discovered that rats which were fed dried shrimp gained more weight than animals of comparable groups receiving identical quantities of fish or cod meal.

A chemical analysis showed that the tryptophane content of the raw protein in dried shrimp was about 1.5 times as great as that of the fish and cod, with fish meal having a slightly higher percentage than cod meal. These results led the Institute scientists to believe that there is a definite connection between the tryptophane content and the nutritive value of the protein feeds used in the experiments.

The validity of these findings will be tested by further investigations since it might be possible in this way to develop standards for the nutritive value of protein feed. Such standards may be of practical importance because recent experience has shown that the raw protein content hitherto considered the determining quality factor is not a really dependable standard to establish the nutritive value of fish meal.



Haiti

CANNED SARDINE MARKET: Imports of canned sardines into Haiti are estimated to vary between 157,000 and 187,000 pounds a year and represent the total consumption since there is no domestic production. The trade in canned sardines is very small but fairly well stabilized, states a June 27, 1956, dispatch from the United States Embassy in Port-au-Prince.

Consumption of all packaged foods, including sardines, is low in Haiti due to the low per-capita income which is estimated to average only US\$60-70 yearly. The low-income group, which forms at least 80 percent of the population, can rarely afford packaged food of any kind.

Imports of sardines and similar fish (with or without oil) during the year October 1954-September 1955 totaled 157,000 pounds valued at US\$32,590. Canada was the leading supplier with 108,770 pounds (value US\$21,483); followed by Holland with 24,215 pounds (value US\$3,813); France 12,914 pounds (value US\$5,031); and the United States with only 5,319 pounds (value US\$636). The balance of 5,781 pounds valued at US\$1,628 came in small quantities from six other countries.

Other canned fishery products imports are included in a basket category which comprises cod, herring, haddock, mackerel, tuna, with or without sauce or oil, and salmon in sauce or in oil. Imports of this basket category during the same year totaled 7,100 pounds of which 2,500 pounds came from the United States.

About 80 percent of the canned sardines sold are $3\frac{1}{4}$ - to 5-oz. flat cans, and the balance are packed in 1-lb. tall and oval cans and 8-oz. oval and tall cans. Of the sardines sold, 40 percent are in olive oil, 40 percent in vegetable oil, 12 per-

Table 1 - Retail Prices of Canned Sardines in Haiti in Mid-1956								
Size of Can	Olive Oil	Vegetable Oil	Mustard	Tomato	Natural	Brine		
$3\frac{1}{4}$ to 5 oz	25	12	10	10	10	10		
8 oz. tall	50	30	-	30	30	30		
1 lb. tall	-	-	-	40	40	40		
8 oz. oval	50	30	-	30	30	30		
1 lb. oval	-	-	-	40	40	40		

cent in tomato sauce, and the balance brine, natural, and mustard sauce.

Consumption of sardines is confined to the high (40 percent) and the middle (80 percent) income groups with consumer preference (probably influenced by price) about equally divided between vegetable oil and olive oil as a packing medium.

The retail price of the $3\frac{1}{4}$ to 5-oz, sardines packed in vegetable oil is 12 U. S. cents; tomato sauce and brine 10 cents, and in olive oil 25 cents (see table 1). Small quantities of high-quality sardines of Portuguese and French origin enter Haiti as luxury items and retail for 50-60 U. S. cents for the 4- to 5-oz. flats.

All imports of sardines enter Haiti through regular commercial channels and any increase in the imports from the United States would be contingent on the ability of United States suppliers to meet the price competition from other importing countries, particularly Canada. The Haitian market is more influenced by price than quality, packing, or other factors and it is unlikely that this trade pattern will change in the near future. Due to the low per-capita income, the largest volume of imported fish is bulk salt cod, which can be purchased at retail in small quantities at relatively low prices.

Hong Kong

NEW NET FACTORIES: An interesting development for Hong Kong's fishing industry recently took place with the installation in one factory of several machines for the automatic weaving of fishing nets. Approximately 80 people are employed on this work and production is expected to vary from 12,000 pounds of cotton fishing nets a month up to a maximum output of 36,000 pounds. Approximately 14,000-40,000 pounds of cotton yarn are used monthly and the nets woven on these machines reportedly are much in demand, locally and for export.

Another recently-established factory has now come into full production; it is a weaving mill, employing about 30 workers for the production of net cloth (about 100,000 yards monthly) and bags for use as vegetable containers (September 27, 1956 dispatch from United States consulate in Hong Kong).



Iceland

EXPORTS OF FROZEN FISH TO U.S. INCREASE: For the first time in two years Icelandic exports of frozen fish to the United States are definitely on the increase. Shipments through September 31, 1956, were expected to reach about 12,072 metric tons in comparison with 9,153 metric tons for the same period last year. Total exports for all of 1955 amounted to 10,888.

It is not certain that shipments will hold up at an equal pace through the balance of this year, but it seems safe to conclude that total Icelandic earnings from fish exports to the United States will be considerably higher this year than last and may approach the high level of 1954 (over 19,000 tons).

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HERRING CATCH ON SOUTH COAST HIGHER IN 1956: Although daily catches of herring on the South Coast of Iceland have been only fair, the total as of September 1, 1956, was expected to exceed that for the similar date in 1955 by about 82 percent. The increase was reported to be due to an earlier start this year than last. The total catch to midnight September 1 was 10,645 metric tons as compared with 5,840 tons as of the same date in 1955. The catch as reported by the Iceland Fisheries Association is as follows:

Destined for:	1956	1955
Salted	4,498	1,952
Reduction	1,096	-
Freezing	5,051	3,888
Total	10,645	5,840

A new contract has been signed with the Soviet Union for an additional 25,000 bbls. of salted South Coast herring. This leaves a total of 85,000 bbls. under order, 75,000 for the Soviet and 10,000 for Poland.

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NEW TRADE AGREEMENT WITH RUSSIA INCLUDES FISHERY PRODUCTS: As a result of trade negotiations held between September 17-27, 1956, the Iceland Minister of Foreign Affairs and the Soviet Director of the Ministry of Foreign Trade signed a new trade agreement on September 27 that will be effective for the calendar years 1957, 1958, and 1959. The new trade agreement proposes Icelandic exports of fishery products to Soviet Russia as follows (quantities in 1956 agreement

83

shown in parentheses): frozen fish fillets 32,000 metric tons (20,000); salted herring 15,000 tons (15,000); frozen herring 1,000 tons (none); and unclassified commodities to the value of 2 million Iceland kroner or US\$123,000 (unchanged from 1956).

The 1956 Trade Agreement was amended recently to include an additional 8,000 metric tons of frozen fillets to be delivered by Iceland to Soviet Russia this year, making a total of 28,000 tons in 1956, points out a September 28, 1956, dispatch from the United States Embassy at Reykjavik.



CONFERENCE DISCUSSES DEVELOPMENT OF FISHERIES: An all-India Fisheries Conference was scheduled at Madras from September 19-22. The conference was to discuss important problems relating to planned development of fisheries in India under the Second Five Year Plan. The subjects listed for discussion at the conference included ways and means of increasing fisheries production, establishment of fishing harbors, development of fishing craft industry, preservation and utilization of fish and fishery products, and transport facilities for the industry. (United States Embassy, New Delhi, report dated September 20, 1956.)

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SECOND FIVE-YEAR PLAN INCLUDES COMMERCIAL FISHERIES DEVELOP-MENT: Development plans now under consideration envisage a 50-percent increase in India's fish catch in the next ten years. Every year the fisheries contribute about Rs. 270,000,000 (US\$56.6 million) to the country's national income, engage about 75,000 craft of various types along a coastline of about 3,000 miles, and give employment to some 750,000 fishermen.

Technological improvement and research form a vital part of the Rs. 120,000,000 (about US\$ 25.2 million) scheme for fisheries included in the second Five-Year Plan of India, states The Fishing News, August 10, 1956.

At the beginning of the first Five-Year Plan, India caught about 1,000,000 metric tons of fish a year.

Improvements effected in the means of catching fish during the first Plan period increased the yield by about 10 percent and in 1955/56 it was estimated at 1,000,000 tons. During the second Plan period the catch is expected to increase by about 33 percent, i. e. 1,400,000 tons.

India's inland and marine fisheries made appreciable headway during the first Plan period. With a Plan provision of Rs. 50,000,000 (US\$10.5 million), improvements were noticed in many fields -- in the method of fishing, bringing under the fish culture large bodies of water currently lying fallow; introduction of new methods of scientific fish farming; and better forms of storage, transport, and marketing.

Added to these were the application of extension methods to meet the practical needs of the industry.

The importance of fisheries to India's economy and the need for its systematic development were emphasized by the Deputy Minister of Food.

The Deputy Minister is shortly leaving on a tour of China. He said that during his stay there he would study the development of fisheries. On his way back he has planned to visit Thailand and Burma.

The Deputy Minister of Food said that there was a great scope for the development of fisheries in India. The Government of India had already made a beginning in that direction by taking up deep-sea fishing and charting fishing grounds.

The program would be stepped up in the coming years. The plan provides for the development of inland and marine fisheries to supplement the food needs of the country, which has a low per capita land holding.

According to India's fisheries development scheme under the second Plan, Malabat in South India would get an allotment of Rs.367,000 (US\$76,939) for the year ending March 31, 1957.

The development of fisheries will consist of equipping modern fishing boats, providing nylon nets and bait arrangements to transport fresh fish to interior areas, starting of small-size ice plants in fishing centers, and giving subsidies to cooperative societies of fishermen.

The Government of India has sanctioned a sum of Rs.4,300,000 (US\$901,468), the largest grant for any district for the development of the fishing industry in Tanjore District, South India, during the second Plan period.

A detailed programme has been drawn up for the development of coastal and inland fishing in the district which has a coastline of 160 miles. The scheme aims at mechanizing fishing craft, providing facilities for storage, etc., and training fishermen.

A Fishermen's Training Centre at Brankulam, South India, to impart academic and practical instruction in fishing has been started.

Under the second Plan, the State authorities had made considerable provision to improve the standard of living of fishermen and their method of fishing. The Training Centre was part of the many schemes now being implemented in the State.

The third of its kind to be opened in India under the joint program of the Government of India and Food and Agriculture Organization, the Centre aims at increasing fish production and improving the standard of living of fishermen.

Under the scheme, a batch of 20 fishermen selected from different areas of Travencare, Cochin, and Nalabar, and South Kanara districts will receive training for six months on principles of navigation and seamanship. They will also be helped in the use of mechanized fishing boats and fishing tackle for deep-sea fishing operations.

There are about 22,000 persons along the sea coast of Travancore-Cochin engaged in fishing. It is proposed to manufacture and issue mechanized boats to fishermen at concession rates.

The Travancore-Cochin Government has also accorded administrative sanction for the construction of a breakwater to provide landing facilities for over 3,000 fishing boats, particularly during the rough season at Vishinjam, nine miles south of Trivandrum, at a cost of Rs. 2,100,000 (US\$440,252).

Preliminary investigations and a survey for the breakwater scheme will be done during the current year and the actual construction work will start next year.

The State Government has requested the Government of India to lend the services of two Swedish harbor experts who are now in India on an FAO assignment to conduct an investigation.

A boat-building yard is to be established at the fishing bay for the construction of mechanized boats for the fishermen.

A demonstration of mechanized deep-sea fishing operations was given off Mangalore, South India, to a party of officials and nonofficials. Mechanized fishing was started here under the guidance of an FAO fisheries expert.

This boat is now being operated by local fishermen on a lease basis with good results. The Fisheries Department is also conducting deep-sea fishing operations with the help of another power-driven trawler received under the auspices of the Technical Cooperation Mission to the Madras Government.

A few more trawlers of the Danish type will be allotted for leasing out to local fishermen by the Madras Government.

A scheme to give technical and financial assistance to fishermen's cooperatives and fishermen's associations has been drawn up by the Uttar Pradesh Government for improving the fishery resources and giving an impetus to fishermen in that State.

A total nonrecurring expenditure of Rs. 1,140,000 (US\$239,000) is envisaged during the second Five-Year Plan period and a sum of Rs. 50,000 (US\$10,482) has been earmarked for the purpose during the current financial year.

During the first year of the Plan, five parties of fishermen's cooperatives or fishermen's associations will be given aid to the tune of Rs. 10,000 (US\$2,100) per party.

During the second, third, and fourth years of the Plan, financial help will be given to 20, 25, 30 and 40 fishermen cooperatives or associations, respectively. The Government of India is expected to share the cost of the scheme on a fifty-fifty basis.



Israel

SHRIMP FISHERY: The demand for shrimp is light in Israel because of religious dietary laws. However, Israel is attempting to develop the production of shrimp for the limited domestic market and the export market, a September 13 dispatch from the United States Embassy in Tel Aviv states.

A technician in the United States Operations Mission who has been working with the Israel fish industry, stated that the production of shrimp is still largely experimental and that no accurate figures are available regarding the annual production of shrimp. It is known, however, that the present volume is very small and this supply is sold through a few nonkosher restaurants and other outlets. The technician mentioned that it is hoped that within the next year the total production of shrimp will be increased to about 100 metric tons a year. If the production is increased to 100 metric tons, it is expected that 20 tons will be used for local consumption and 80 tons will be available for export.



Italy

FINANCIAL ASSISTANCE TO FISHING INDUSTRIES PROPOSED: When the Italian Senate reconvenes, it will examine a bill, presented by the Minestry of Merchant Marine, authorizing extraordinary expenditures from the budget for fiscal 1956/57 for a 300-million lire (US\$480,000) program for the development of fishing activities. In particular grants will be made for the construction of new fishing boats in national yards to replace existing obsolete vessels of less than ten tons and with motors of less than 45 hp.

Grants may also be made for the repair and improvement of boats for the transportation of fish, to set up installations for processing fish and warehouses for the storage of fishing provisions, and for the construction of workshops to repair fishing equipment.

Further contributions may be granted for the construction of fishing markets and for the renewal of fishing equipment, including nets, cords, cables, refrigerators, etc.; for the development of installations to produce ice; for the installation of two-way radios; for the operation of homes for the children of fishermen; and for conducting surveys of potential new fishing grounds.

Finally, the subsidies may be granted to Italian companies to construct fishing vessels, which will use exclusively Italian crews, providing such boats weigh not less than 1,000 tons and that they operate on the high seas at long distances from the Italian coast at least six months during each year.

Note: Values in US\$ based on rate of 1 lire equals US\$ 0,0016.

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MARKET FOR MARINE-ANIMAL OILS: The Italian market for oils derived from fish and marine mammals is insignificant as compared to that for oils derived from vegetable sources. Production of marine animal oils in Italy is negligible and imports, principally for edible purposes, amounted to only 8,423 metric tons in 1954 and 7,889 tons in 1955. The annual consumption of edible vegetable oils is estimated at about 400,000 metric tons, according to a survey made by the Foreign Agriculture Service of the United States Department of Agriculture.

The imports of marine-animal oils for 1955 consisted of 1,292 tons of codliver oil (over half of which came from Norway) and 6,597 tons of other marine-animal oils (Norway supplied 48 percent of the total, followed by Australia with 20 percent). No imports were listed as coming from the United States. Only 11 tons of marine oils were exported in 1955 by Italy.

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PARTICIPATES IN GENERAL FISHERIES COUNCIL FOR THE MEDITERRANEAN: The Italian Ministries of Agriculture and Merchant Marine, responsible respectively for inland and coastal fishing matters, participated in the September 17-23, 1956, meeting at Istanbul of the General Fisheries Council for the Mediterranean. (Other participants were Turkey, France, Spain, Egypt, Greece, Yugoslavia, Israel, Tunisia, and Monaco.

The Italian Government has indicated its deep interest in this meeting since it is hoped that it will provide the means of bringing its industrial and commercial fishing installations more up to date through the application of modern techniques. (August 31, 1956, dispatch from United States Embassy in Rome.)

Note: Also see Commercial Fisheries Review, October 1956, p. 45.



Japan

ANTARCTIC WHALING FLEETS FOR 1956/57 SEASON INCREASED: The Japanese whaling fleets that leave Japan early in November for the Antarctic 1956/57 whaling season will consist of five factoryships and 54 catcher boats. Included is the Olympic Challenger fleet (a factoryship and 15 catcher boats) that was purchased in the spring of 1956 from a Greek shipping firm for US\$8.5 million. The fleets for the 1955/56 season consisted of three factoryships and 40 catcher boats.

It is estimated that when the season ends in the early part of 1957 that the catch will be 30 percent greater than the 6,462 actual whales caught in the 1955/56 Antarctic whaling season (69,505 metric tons of oil reported in 1955/56). The additions to the fleet of whalers will make the Japanese fleet second to that of the Norwegians.

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BRAZIL INVITES RESEARCH SHIP TO SURVEY FISHERY RESOURCES: In response to an invitation from the Brazilian Government, the Japanese will dispatch the Toko Maru of 1,100 gross tons to survey undeveloped fishing grounds in the South Atlantic. This project was originally planned to be made in cooperation with the Argentine Government, but plans failed to materialize. The survey ship is one of the most advanced type with modern equipment and facilities and carries a 40-man crew and 8 scientists. The ship will engage mainly in trawling and if successful the Japanese Fisheries Agency hopes to form a joint Brazilian-Japanese fishing company.

The <u>Toko Maru</u> is scheduled to leave Japan about the end of October on a 6-10 months round-the-world survey trip. The first part of the trip will take the vessel through the Indian Ocean to Brazil for the planned survey. During the approximately 6 months' stay in Brazilian waters, the ship will operate from bases in Rio Grande, Rio de Janeiro, and Belem and report findings to the Brazilian Government. She will then proceed to the Dominican Republic and Mexico to investigate overseas fishing ventures with these countries, states a September 7 dispatch from the United States Embassy in Tokyo.

Note: Also see Commercial Fisheries Review, March 1956, p. 42.

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<u>CANNED SARDINE PACK FOR 1955</u>: The Japanese pack of canned sardines for the calendar year 1955 amounted to 899,122 actual cases, according to a September 25, 1956, dispatch from the United States Embassy in Tokyo. Although sardines

Table 1 - Japanese Canned Sardine Pack by Can Size and Style of Pack, 1955										
Size of Can										Percentage
Style Pack	3-4 oz.	4-5 oz.	5-6 oz.	8 oz.	12-13 oz.	24 oz.	54 oz.	Other		of Total
(Number of Cases)										%
Boiled	2,035	54,536	-	-	-	6,103	-	113	62,787	7.0
In oil	5,125	-	-	-	-	-	-	1,215	6,340	0.7
Tomato sauce	-	35,064	165,383	3,677	264,415	-	-	226	468,765	52.1
Brine (seasoned)	9,309	-	273,539	-	69,628	-	2,374	2,205	357,055	39.7
Broiled	3,375	-		-	-	-	-	-	3,375	0.4
Unclassified	-	-	-	-	-	-	-	800	800	0.1
Total	19,844	89,600	438,922	3,677	334,043	6,103	2,374	4,559	899,122	100.0
Percentage of Total %	2,2	10.0	48.8	0.4	37,2	0.7	0,3	0.5	100.0	

Unclassified -

0.3 4.7 56.3

Total

Percentage of Total %

Table 2 - Japanese Canned Sardine Pack by Case Size and Style of Pack, 1955											
Style		Number of Cans to Case									
Pack	6	24	48	96	100	Other	Total				
Boiled	-	6,103	-	2,035	54,536	113	62,787				
In oil	-	-	1,450	-	3,675	1,215	6,340				
Tomato											
sauce	-	32,725	297,944	137,870	-	226	468,765				
Brine											
(seasoned)	2,374	3,021	207,066	142,389			357,055				
Broiled	-	-	-	-	3 375	-	3 375				

2,374 41,849 506,460 282,294 61,586 4,559 899,122

31.4 6.8

were packed in five or more different styles, sardines in tomato sauce (52.1 percent) and in brine (39.7 percent) were the principal packing mediums. The number of cans to the case varied mostly from 24 to 100, but cases with 48 cans to the case and 96 cans to the case accounted for 87.7 percent of the total pack. The pack in terms of ounces to the can (original data in grams, calculated to nearest ounce equivalent) varied between 3 and 54 ounces, but packs of 5- to 6-ounce (48.8 percent) and 12- to 13-ounce cans (37.2 percent) were the principal sizes packed.

CRAB CANNING INDUSTRY OF
HOKKAIDO ISLAND: Three different
were visited the latter part of June 1956

crab canning plants in Northeast Hokkaido were visited the latter part of June 1956 by members of the United States Embassy at Tokyo, and this is a report on their observations:

800

0.5 100.0

In every case the installations were very simple and inexpensive, consisting of boiling pits, cooling pits, work tables, can-sealing machines, and sterilizers. The plants all had about the same annual canning capacity, 85,000-90,000 cases of 48 cans of $6\frac{1}{2}$ -oz. each. The total cost of the equipment probably did not exceed US\$75,000-100,000 in any of the plants exclusive of fishing vessels.

Hairy crab (kegani crab) is canned chiefly in shore canneries; the king crab is canned on ships in the area of catch. Some king crab, however, are caught in the traps which are placed at 20 to 30 miles offshore. Cannery officials said that the large number of king crabs caught this season in traps set for hairy crab at latitudes considerably to the south of the king crab's normal habitat indicates that the stock of king crab in the North Pacific and the Okhotsk Sea is large and that the pelagic catch this year should be good.

Nevertheless, out of a total Japanese crab catch by land-based operations in 1955 of 152.1 million pounds, only 26.5 million pounds were king crab, the remainder, hairy crab. The king crab catch in the area around Habomai and Kunashiri Islands, now held by the Russians, was once very important, but has declined in importance to Japan because crab boats are fearful of being seized, as many have, by the Russians. King crab catches in the Kuriles in 1956 were only 10 percent of the 1955 catches.

For the most part, cannery owners purchase crab from independently-owned crab boats, although a few canneries operate their own crab fleets. The price of crab in Hokkaido is set before the season begins by the boat owners. This year's price, ¥15,000 (US\$41.70) a metric ton, was the same as last year's.

It would appear on the basis of information gathered that the crab canning industry in Hokkaido operates on a fairly high profit margin with a minimum of investment. For example, with everything operating smoothly, one of the small plants visited could produce 200 cases of $48\ 6\frac{1}{2}$ -oz. cans in one 8-hour shift. Production costs for an 8-hour day for this amount, based on information gathered, would be approximately as follows:

Crab $\frac{1}{2}$ 7 8.8 tons @ \\ \frac{1}{2} 3.8 tons @ \\ \frac{1}{2}\$ 3.8 tons @ \\\ \frac{1}{2}\$ 3.8 tons @ \\\\ \frac{1}{2}\$ 3.8 tons @ \\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	<u>US\$</u>
Labor $\frac{2}{}$ - 200 workers @ daily rate of	
¥400 (US\$1.10) 80,000	221
Operating costs, fuel, electricity, etc 20,000 Depreciation on investment 45,000	56
Depreciation on investment $\frac{3}{2}$	125
Materials costs	111
Managerial wages (2 @ Y5,000) 10,000	28
Total	908

1/ 200 cases contain 3,872 lbs. of crab meat. Approximately 20 percent of the crab is recoverable meat. Thus the weight of live crab for 200 cases is 3,872 times 5, or 8.8 metric tons (19,360 lbs.).

2/ There were two hundred employees at this plant, 75 percent of which were female. The rate for female labor in the cannery was ¥200 (55 U.S. cents) per shift, plus food and

3/ Total investment in the plant is estimated at \(\frac{4}{27}\) million (US\$75,000), amortized over a 10-year period, i. e. ¥2.7 million (US\$7,500) per year. But the work period is only about 60 days, thus the depreciation rate is ¥45,000 (US\$125) per working day.

The total cost to produce 200 cases of canned crab meat is approximately \pm 330,000 (US\$917). The f.o.b. Yokohama price of hairy crab per case of 48 $6\frac{1}{2}$ -oz. cans is US\$12.50 or \(\frac{4}{2}\),500. Total receipts from 200 cases would be \(\frac{4}{2}\)900,000 (US\$2,500). This would mean a profit for the cannery of \(\frac{4}{5}60,000\) (\(\frac{8}{1},556\)) for one day's operation.

It is possible that some of the cost items were underestimated, but the two principle ones, cost of live crab and labor, are accurate. However, it is understood that selling and transportation costs in Japan are high.

The question of perpetuating the stock of hairy crab is one which is of concern to the industry although little is being done about it. The only conservation measures on crab are the limits on the season and the number of boats, which are controlled through a licensing system. But some observers fear that the stock is diminishing although this opinion is not based on a thorough scientific study because none has been made. The problem of controlling fishing activities in Japan is a very difficult one. Many factors account for this: (1) the Japanese are aggressive and efficient fishermen; (2) there are hundreds of small fishing boats independently-owned in Japan and there are pressures ever present to utilize the equipment and realize a return on it; (3) employment (or unemployment) is an ever-present problem -- there are people always ready to share the risk of unauthorized fishing; (4) the coast line is long, making patroling difficult.

The crab industry on the Eastern tip of Hokkaido, facing the island of Kunashiri, was reported to have had a very poor season this year, chiefly because crab boats were fearful of venturing into the area over which the Russians have jurisdiction. The March 23, 1956, announcement by the Russians restricting salmon fishing and the seizure of a Japanese fishing boat coincide with the opening of the crab season, and even though the Russian restrictions for 1956 did not include crab, many boat owners were wary of going into the restricted area. It was reported that crab canners in the Eastern area of Hokkaido feel that the industry might be facing a difficult period because of the Russian attitude and some are converting their equipment so that it can be used for vegetable canning.

The 1955 crab pack (both land-based and high-seas) was approximately 690,000 cases (48 $6\frac{1}{2}$ -oz. cans) of which 480,000 cases were canned in Hokkaido canneries (kegani crab) and 210,000 on cannery ships (king crab).

Owing to bad weather in the early part of the 1956 season (April and May), the catch was poor and there is some doubt that the kegani crab target of 300,000 cases can be reached. Some observers believe that the total kegani crab pack will not exceed 200,000 cases.

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THE CRISIS IN THE TUNA INDUSTRY: A panel discussion held at Misaki, Japan, on August 23, 1956, considered the problems which might be taken up by the Tuna Fishery Investigative Committee recently established by the Japanese Fisheries Agency. The following report on the discussion appeared in the Suisan Shuho (September 5, 1956), a fishing industry weekly:

Participants: M. Teramoto, Member of the Tuna Fishery Investigative Committee, President of the Kanagawa Prefecture Tuna Fishermen's Association; S. Sugano, President of the Kanagawa Prefecture Tuna Society; K. Mito, Secretary of the Kanagawa Prefecture Tuna Society; N. Hayashi, Managing director of the Kanagawa Prefecture Tuna Fishermen's Association; M. Kojima, Owner of the Daikoku Maru; W. Mabune, Assistant Manager of the Misaki office of Taiyo Gyogyo Co.; T. Okamoto, Official of the Kanagawa Prefecture Tuna Society.

Tuna Resource Problems: Moderator: The Establishment of the Tuna Fishery Investigative Committee as a consultative body for the Minister of Agriculture and Forestry means, I think, that the tuna fishing industry has at present come to a period when changes must be made. We would like, therefore, to have all of you here at this tuna fishing center of Missaki talk freely about the present situation in the industry and about what you hope for from the Investigative Committee, after which I hope that we will be able to draw some conclusions as to what the Committee should do. Will you speak first, Mr. Sugano?

Sugano: Well, it is my personal opinion that the tunas represent the largest resource among all fishes, followed probably by the salmon and the bottom fishes. Their range of occurrence stretches from 40° on the north to 30° or 40° on the south, with its center on the equator, and up to the present the fishing fleet has been operating freely with the center of its efforts likewise placed in the equatorial region. Thus the resource is extremely large, and I think that we have come to a period when we must consider whether or not we are actually utilizing it to the full. Therefore, first of all we must find out how large the resource is. We cannot go forward into an era of free competition unless we build ships and put them into productive operation. And for that we need a reasonable price for fish. Assuming that there is a limit to the resource, we will have to study the question of whether to restrict the catch by regulation or to get reasonable prices by improving our product. I would like to have the government take up these points.

I hope that Mr. Teramoto will inform the government that we would like to have these points studied, or that we are studying them, and that they will take thought for the future prosperity of the tuna fishing industry. Furthermore, since the fishing grounds are so extensive, there may be friction with foreign countries, and I think that we must take into consideration working together with other countries in the future to conserve and build up the resource.

Hayashi: I have little to add to what Mr. Sugano has said, but I too am most hopeful for action on the problems of the resource. I am a businessman and am not directly concerned with technical or scientific matters, but in the old days, when I first got involved in the tuna business, the small boats used to put out from Misaki and return in 3 or 4 days. And that was not so very long ago. Now the ships are being built larger and larger and the fishing grounds are becoming more distant. This trend has been particularly conspicuous since the war. After the MacArthur Line was done away with, the fishing grounds expanded suddenly, and at that time big catches were made in a few days of fishing on the new grounds, but after

a little time had passed the catch per day gradually declined and the number of days of operation increased. In the old days it was said that the resource was inexhaustible, but I feel, as a layman, that this was a mistake. I particularly hope that the Committee will study this point.

New Fishing Grounds: Kojima: Well, I have been going to sea for over 20 years, and back in the period from 1929 or 1930 to 1937-38, when the southern fishing grounds were being opened up, we fished with boats of 30 to 100 tons. Around 1937 this development came to a standstill, but thereafter good catches were made in the Mandated Islands area and they continued until 1940-41. At that time catches ran around 1,000 kan (8,300 pounds) a day. In the same Trust Territory area at present, using 100- to 150-ton boats, the catches have decreased to about half that, or 400 to 500 kan (3,300-4,100 pounds). As Mr. Sugano has said, the range of the tuna is from 44°-45° north to 30°-35° south, but it can be broadly divided into three grounds -- the Indian Ocean, the Pacific, and the Atlantic. Two of these -- the Indian Ocean and the Pacific -- are being fished at present and on these two grounds the catch rates are dropping year by year. I don't know whether the resource is still there or not, but there is no mistaking the fact that the catch rates are dropping, and if the producers do not take that into consideration, it is clear that the development of the business will be stymied.

Mabune: I, too, as one directly concerned in the fishery, am most worried about the problem of the resource, as mentioned by Mr. Hayashi. The Taiyo Company has operated 13 mothership expeditions, usually on fishing grounds in the Fiji area. Formerly catches were 1,000 to 2,000 kan (8,300-16,500 pounds) per day, but last year they declined to 500 to 700 (3,300-5,800 pounds) and the expedition had a hard time. If this condition continues, it will be difficult to plan operations. I lash ohope that the Committee will take up the investigation of new fishing grounds.

Mito: I hope for a great deal from the Investigative Committee. From the production angle, it is a fact, as you have all said, that there has been some thinning out of the resource. The scientists may be right in saying that the fish aren't disappearing, but it seems to be a fact that they aren't being caught. We have no clear basis for saying what is happening to the resource. On this point, I hope for studies that will make clear the life of the tuna. I think that if this is not done, it will be hard to find fundamental solutions for the problem of marketing and the other problems which are based on the biology of the tuna.

The marketing field at present is handled by a branch of the Fisheries Agency, but I wonder whether policies can be set up adequately in this way and I would like to have the Investigative Committee take part in basic talks on this problem. I would also like to see them extend their interests to business management. If they get into management problems, there is a danger of their also getting involved in financing problems, but I would like to see them work out some basic lines on such questions as what type of management to use with what type of vessel. At any rate, I hope that they will set up a basis as suggested above.

Clarify Thoroughly the Increases and Decreases in the Tuna: Moderator: We have heard various opinions, but Mr. Teramoto, what do you, as a member of the Investigative Committee think?

Teramoto: If you ask me what I think as a member of the Committee, I think that the most important point is the resource from the point of view of the production field, and I think that we must investigate it thoroughly at this time. Bigger vessels have been coming off the ways since 1951 and the tuna have been fished farther and farther out from the bases, until at present, as you know, there is no part of the Pacific where they don't fish, and the fishery has also developed into the Indian Ocean and even to Madagascar and the Arabian Sea. As for conditions on those grounds, at first catches ran 5,000-6,000 kan (41,000-49,600 pounds) per day, whereas at present they will go 3,000 kan (24,800 pounds) at best and average around 1,000 kan (8,300 pounds). That is in the Indian Ocean, but when we come to look at the Pacific, we can say that the grounds are already fished down, with daily catches of 500-1,000 kan (3,300-8,300 pounds) regarded as highly success-

We think, therefore, that the resource problem has got to be investigated from various angles. To put it briefly, we can say that 4 or 5 years' statistics show a gradual decline. There are those who, from academic theories or hypotheses, say that the fish are not decreasing but may be increasing, however, this is a knotty problem. I think that we, as a committee, must come up with some solution.

In brief, the decline of the catch is a fact. It is not easy to show this clearly, but I hope that even if it takes considerable time we will be able to get a thorough solution of the problem of the resource. One school of thought is that it is actually declining gradually. However, one tuna spawns tens of thousands of eggs; how many of these survive and grow is a question which we must ask the scientists to study, for at present the growth rate is not clearly known. Until this is known, the problem, I think, cannot be solved. There are probably several methods, but thinking about it as a layman, I wonder if it might not be possible to find the spawning ground, capture some of the young fish, and rear them to study the growth rate. I hope that the scientists will do some basic work on this point.

Make More Use of Tagging Experiments: Sugano: Still talking about the resource problem, I think that there are various species of fish which are not decreasing in numbers, but it is a fact that the tuna are declining. It is a question, however, whether they are among the species which can be completely fished out or whether they will just decrease down to a certain limit and then continue at that level.

For instance, I think that the following can probably be said. In the Indian Oceandaily catches of 4,000 to 5,000 kan (33,100-41,300 pounds) were the usual thing, but now if 2,000 kan (16,500 pounds) is taken it is top fishing. However, when catches of 5,000 kan (41,300 pounds) were being made it was a yet unknown ground and Japanese boats were fishing there for the first time, so naturally the fish took to the bait well. That's why they could catch 5,000 kan. Then when they went there subse-

quently the catches dropped to 2,000 kan. It might be that the fish have become more knowing, and I wonder whether we can say right off that the resource has diminished. I'm afraid that we may hear the argument that if the resource has declined we had better not go fishing there. If we can't operate on the 5,000-kan level, then it becomes our duty to try to operate on 2,000 kan, and I think that we need to carry on our business with this idea in mind. There is need for persistent investigation of the scope of occurrence of the tuna, and for this purpose good use should probably be made of tagging. We of the Tuna Investigation Society have been tagging tuna, under the direction of the Kanagawa Prefectural Laboratory, by tying vinyl tags on their tails. However, with this method the fish die, and we must find a simpler method which will keep the fish alive so that we can investigate their migrations, spawning, and so forth under natural conditions, and perhaps, if it is necessary, we might even set aside a certain area as a preserve in order to protect the resource. I certainly don't want things to reach the point where we will be told that we must not catch the fish because they are decreasing in numbers.

Regulation Must Come: Teramoto: I sympathize with the views that have just been expressed, but I hardly think that the vessels in operation at the present time will be told to cease because the resource is declining. However, I do think that it may be a poor idea to increase the fleet above the present level. Therefore I believe that some degree of regulation is unavoidable. The problem, of course, is in the method . . .

We have to study beforehand how far the resource has declined; it isn't enough just to squawk about the decline. What we are worried about is the business operations based on that resource--and I think that there is a need to study to find out how long the present state of affairs can last and whether really stabilized operations are possible. I believe that the Committee must, in cooperation with the industry, work hard and from every possible angle on the resource, the management of the industry, and marketing in order to lay out a course and attain its first objectives.

<u>Guidance and Direction are Prerequisites</u>: Moderator: What is the business situation among the tuna boat operators?

Teramoto: Business conditions are difficult. An outsider might think that because boats have become bigger, the business has also become bigger, but the boats have become bigger because it has become more difficult to catch fish and the operators are plunging ahead in competition with one another. That is why the boats are being built larger. The question is whether or not we can continue in business indefinitely with things going along as at present. The government has got to think up some thorough-going measures to keep our business going, because if it is left to go along the way it is now, we will go broke. I think that various regulatory policies could be devised, but the first thing to consider is the "guidance ves-sels," the government-owned ships. These vessels don't pay any taxes nor do they have any trouble raising capital. Some of the privately-owned boats, meanwhile, are operating on borrowed mon-ey. Although the resource is drying up and fish are getting hard to catch, the price of fish doesn't go up at all, and that is why our business is in

trouble. When we consider what to do about it, well, it looks as if we have to cut down the number of boats. However, for the privately-owned boats operating at present, this is their life and their vocation, and they must keep at it until they drop. The government has got to do everything it can to protect them and foster them. One of the ways in which they can be helped that naturally comes up for discussion is the control of the research ships.

Hayashi: These "guidance vessels" are really a problem, aren't they? There are probably about 90 of these government ships in all. Perhaps half of them are so-called guidance vessels, and even prefectures which have no fishing industry are building them to catch tuna, indeed, putting all of their efforts into catching fish, which is a little too much for the private boat owners to stomach.

Government Boats Take Away the Best Fishermen: Moderator: Is there any directly apparent damage from the guidance vessels?

Kojima: There is. First of all, they pick up the best fishermen, because the government boats give a fixed salary and a share of the catch on top of it, so they give a more stable income than the private boats. That is why they can pick the best fishermen and therefore they are cleaning out the fishing grounds in a way that we can't compete with.

Sugano: This word "guidance vessel" sounds good, but na ctuality they are far from providing any guidance. It's generally the privately-owned boats that search out the grounds and then the government boats come nosing along afterward. It's really more than we can stand for!

Kojima: They don't do any guiding, and the name is a bit presumptuous. (All agree.)

Moderator: I suppose that this matter of guidance vessels will come to be a problem of administration in the future, but now I would like to hear from Mr. Hayashi on the fish price problem as another one affecting business.

Establishment of Reefers as a Measure to Help Prices: Hayashi: I am always thinking of ways to help the price situation. In addition to propaganda for the consumption of fish and expansion of markets, large refrigerator plants should be built, especially for tuna, so that when big catches are made or when fish are overabundant in a certain district, they could be stored. Then they could be sold when fewer vessels were coming into port. Don't you think that this sort of management would stabilize the price of fish? I would like to have the government finance the construction of refrigerator facilities in a base like this. Our association is selling fish cooperatively, so we feel this need very keenly.

Mabune: With frozen fish we don't have the sort of instability we have with fresh fish. At present the amount of frozen fish is increasing, which means that the amount of fresh fish is declining, but the decline in the amount of fresh fish has not brought about as much of a general price drop as was feared. This is the good effect of refrigeration. Refrigeration on shipboard is still a problem, but on my vessel we have got used to handling it and we are getting just about the kind of prices we plan on. At first, before we were used to it, we some-

times landed poor quality stuff, but now

Mito: Looking at the figures, frozen fish beggan to increase sharply around 1953. According to our survey, 1953 was up 50 percent over 1952, it doubled in 1955, and there was another 50-percent increase in 1956. In connection with this rapid increase, if we look at the price situation mentioned by Mr. Mabune, there was a temporary drop in 1952 at the time of the Bikini incident, but since then the price has gone up despite the increased catch, and this year even the price of unfrozen fish has increased.

In other words, this means that by using frozen fish the price can be maintained above a certain limit. This is not to say that it can be increased, but frozen fish can play an important role in stabilizing it within certain limits. Therefore, in response to this stabilized price, must we not hereafter think of ways to improve the pattern of business operations in the fishery? For example, up to now we have been finished with the fish after they have been sold at the auction and have not been concerned with the price thereafter at all. What kind of a marketing structure will give the least spread between the final price and the price to the producer? What kind of a price will keep the consumers from turning away from tuna and at the same time overcome the low state of the resource? These are the questions to which, within the capabilities of the present situation, I would like to get scientific answers. I hope that the Committee will get into these matters.

Moderator: We have put in a lot of time here, and now I wish that Mr. Teramoto, as a member of the Tuna Investigative Committee, would present his views as to what the Committee may do in the future to solve-these various problems.

The Fishing Grounds are Overexploited: Tera-moto: We have heard may worthwhile comments from all of you, and they are valuable to me as a member of the Committee. I will try to do all I can for you from now on. Various matters have been discussed, but the point is that there is money being made in the tuna fishery and everyone has been trying to get in to share it, so that it can probably be said that the industry is at a peak at present. If it were to continue as it is now it would be fine, but there is no assurance that it will. As has always been said in the past, if a thing gets real good, there is bound to be a reaction, and since the tuna fishing industry is today at the top, we must consider that there is bound to be a day when the reaction will set in and things will get bad. Then those of us who have been in the business for many years and those newcomers who have come into the fishery because there is money to be made there will all go down to ruin together. In that eventuality I hope the government will think very seriously about whether to save those who were already in the fishery or whether to rescue the new operators. I think that there have got to be some real regulatory measures Those who have been fishing tuna for 30 or 40 years have been through hard times at least two or three times, and I think that these people who have specialized in tuna fishing must be protected. If it comes to regulation, I would like to have it start with the 90 guidance vessels. The problem is how much actual guidance they are doing under the name of "guidance vessels." This

year is already the peak--will it continue thus for years, or is the fishery already in a dangerous condition? Thave just heard various views concerning the resource, and my opinion is that it is playing out. The reason I think so is that, as several of you have stated, the catch rates are actually going down with every cruise. Even though we knew about the increase in juvenile fish that the scientists talk about, we don't know about the increase in growth after that stage, and if it cannot be affirmed that the tuna are decreasing, neither can it be affirmed

that they are increasing. Therefore at this time we must investigate these things thoroughly and construct a basic foundation so that, just because there is money to be made in tuna fishing now, everyone won'tbe allowed to get into the fishery with the result that the old established operators will go broke along with the newcomers.

Moderator: Thank you all for your valuable views and for the time that you have devoted to this discussion.

CULTURED PEARL INDUSTRY AF-FECTED BY HOT SPELL: The most important cultured pearl farms in Japan are located in the Nagoya District at Ago and Matoya Bay in Mie Prefecture. As a result of unusually hot weather in early August the temperature of the water rose suddenly from a normal high of 26°C. (78.8°F.) to 33°C. (91.4°F.) causing an estimated loss of \$1,219,280 or 25 percent of the total



value of existing pearl oysters (Sources: Local press and Mie Prefecture Office; United States consular dispatch dated September 10).

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FISH NET KNITTING MACHINES AND OPERATORS TO GO TO CANADA: It is reported that one of the seven largest Mie Prefecture (Nagoya District) manufacturers is concluding arrangements to send its machines and technicians to Canada under a technical cooperation agreement to make synthetic fiber fishing nets for salmon and trout fisheries. Japanese authorities fear that this move will induce Japanese manufacturers to offer their products at unprofitably low prices in order to sell their stocks before Canadian production commences.

Mie Prefecture has long been a center of one of Japan's oldest industries, the manufacture of fishing nets. Until 1950 all nets were made of cotton or hemp but since then synthetic fibers have become increasingly important. In 1951 only 98,000 pounds of synthetic fiber fish nets were produced; in 1954 production had increased to 894,000 pounds and in 1955 it reached 1,283,000 pounds while in that year 2,182,000 pounds of cotton and 69,000 pounds of hemp fish nets were produced. The Canadian market has always been of major importance to this industry. (United States consular dispatch dated September 10, 1956, from Nagoya.)

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FISHERY PRODUCTS EXPORTS RANK FOURTH IN VALUE: For the first 9 months of 1956, Japan's exports of fishery products ranked fourth in value, or 5 percent of the total value of all commodities exported. Total exports of fishery products from January-August 1956 amounted to 131,481 metric tons (value US\$78.3 million), up 79 percent from the 95,889 tons (value US\$43.7 million) exported in the same period in 1955.

Note: Values converted at the rate of 360 yen equal US\$1.

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OVERSEAS FISHING VENTURES PLANNED: In an effort to develop new fishing grounds to relieve overfishing in the coastal waters of Japan, the Japanese Fisheries Agency has asked for appropriations in the next fiscal year to station a fisheries

officer at Singapore. Also planned is an overseas fisheries promotion association which will be subsidized by the Government. (United States Embassy Dispatch from Tokyo dated September 7, 1956.)

The fisheries officer planned for the office of the Japanese Consulate General in Singapore will supervise fishermen operating in the Indian Ocean and surrounding waters, promote joint fishing ventures with Singapore and Malayan authorities, and develop markets for Japanese fisheries products. The proposed Japanese overseas fisheries promotion association will be an advisory organ to the Government in overseas fisheries development and planning. In addition, the association will take an active part by conducting surveys, opening overseas consultant offices, and developing overseas markets. The undeveloped fishing grounds which the Japanese are currently interested in are waters of the east coast of South America, the Persian Gulf, and the Red Sea.

A later report points out that the Japanese fisheries industry has formed an association known as the Japanese Overseas Fisheries Cooperative Association Agency for the purpose of developing cooperative arrangements with foreign countries for the exploitation of fisheries resources in their coastal waters. The Association has applied for a government subsidy of ¥34 million (about US\$95,000) during the next Japanese fiscal year to help it carry out its main objective, which is to relieve overcrowding in Japanese waters by finding substitute employment abroad for Japanese coastal fishermen. The Association will study offers by foreign countries relating to fisheries resource development and will set up overseas branches for the purpose of conducting fisheries resources surveys in various areas of the world in cooperation with the Japanese Government.

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NORTH PACIFIC FACTORYSHIP KING CRAB MEAT PACK THROUGH JULY 1956: The Japanese fleet of six factoryships and 18 attached catching vessels had packed a total of 269,999 cases of king crab meat (48 ½-1b. cans) through July 31, 1956, according to the August 1956, Monthly Statistical Report of Japanese Fisheries.

The pack by area is as follows: Eastern area of Bering Sea, 53,000 cases; Western area of Bering Sea, 31,000 cases; Sea of Okhotsk, 185,000 cases. The pack for the entire season in 1955 made by three factoryship fleets was 206,850 cases. In 1955 the last factoryship left the fishing grounds on September 10.

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NORTH PACIFIC FACTORYSHIP SALMON CATCH FOR THE 1956 SEASON:
The 1956 Japanese salmon catch by factoryship type operations in the North Pacific

amounted to 52,015,731 fish as compared with a 1955 catch of 64,043,900 fish. The catch for 1956 includes 28,270,000 fish (47,776 metric tons) from the Russian restricted area (Aleutians and Okhotsk Sea) and 23,745,731 fish from unrestricted areas (Aleutians and Bering Sea), a United States Embassy dispatch dated September 17, 1956 from Tokyo reports.

In addition to the salmon factoryship operations, the catch by the shorebased drift-net fishery in the restricted area was estimated at 5,918,000 fish (mostly pinks) or approximately 8,004 metric tons.

Area & Year	Sockeye	Diele	Chum	C-h-	China	T1
Area & rear	зоскеуе	PILIK	Chuin	COHO	Cumook	1 otai
North		(1	1,000 Fi	sh)		
Pacific Area:			ĺ			
1956	9,620	11,981	17,165	3,750	136	42,65
1955	12,164	16,508	18,573	3,184	74	50,50
Sea of Okhotsk:						
1956	656	5,366		116	1	9,36
1955	330	9,412	3,404	392	2	13,54
Grand Total;						
1956	10,276	17,347	20,389	3,866	137	52,01
1955	12,494	25,920	21,977	3,576	76	64,04

Japanese North Pacific Salmon Factoryship Catch, 1955-56

Operations by the factoryships in the Russian restricted area fell short 15 percent of the catch limitation of 54,831 metric tons imposed by the Russians.

A summary of the 1956 North Pacific high-seas salmon fishery with comparative data for 1956 is presented in the table.

The pack of canned salmon from the 1955 factoryship catch of about 64 million fish was 1,450,000 cases, total pack from all sources was 1,780,000 cases.

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NORTH PACIFIC WHALING, 1956: Two Japanese whaling expeditions operating in the North Pacific this summer produced 24,922 metric tons of baleen and sperm oil as compared with last year's 19,026 tons, an increase of 31 percent.

Table 1 - Production of Whale Products by Japanese North Pacific Whaling Fleets, 1955-56									
Year	В	aleen	S	perm	Total				
rear	Oil	Oil Other 1/ Oil Other 1/ Oil							
			(Metr	ic Tons)					
1956	12,343	13,957	12,579	3,980	24,922	17,937			
1955	10,882	11,272	8,144	1,569	19,026	12,841			
1/ Mostly frozen and salted.									

The total catch in numbers of whales was 3,168 whales (1,570 baleen and 1,598 sperm) as compared with 2,652 whales (1,568 baleen and 1,084 sperm) in 1955. The catch of baleen whales remained at the same level as last year because of the Fisheries Agency's conservation measure of restricting the catch to 800 blue-whale units. The catch of sperm whales increased nearly 50 percent as compared with the previous year. Japanese fishermen believ this is evidence of abundant stocks in the North Pacific.

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REPORT ON TUNA FISHING OFF TAHITI: The Shizuoka Prefecture's fisheries guidance vessel <u>Daifuji</u> Maru (470 tons) with a crew of 51 has been investigating fishing grounds in the South Pacific in the vicinity of Tahiti since June 28, 1956, reports the <u>Nippon Suisan Shimbun</u> (September 7, 1956), a Japanese weekly periodical. The vessel has now concluded its operations after taking 45,000 kan (372,000 pounds) of yellowfin, big-eyed, and albacore tuna at 36 fishing stations. The vessel sent in by radio the following report concerning the fishing grounds around Tahiti and a new fishing ground 1,000 miles ESE. of Hawaii.

On the Tahiti grounds the catch was mostly albacore, but because the season was inappropriate the schools were small and the fishing was not up to expectations. However, it is thought that this will be rather promising ground in the albacore season.

On the new grounds 1,000 miles ESE. of Hawaii, the catch was big-eyed and yellowfin tuna and the schools were extraordinarily concentrated, with as much as 2,000-3,000 kan (16,500-24,800 pounds) taken per station. This area is thought to show more promise for the future than the Indian Ocean.

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SALMON INDUSTRY OF HOKKAIDO: A salmon canning plant at Kushiro in Hokkaido, operated by the Hokkaido Economic Agricultural Cooperative Association (organized by coastal fishermen) was visited by members of the United States Embassy at Tokyo the latter part of June 1956. This is a report on their observations:

The labor force at the plant was about 100, most of whom were females and the capacity of the plant is 800 cases a day, which requires about 50,000 pounds of raw fish. The plant cans only salmon (chums and pinks) caught in coastal waters by small boat owners and the salmon cannery operation lasts only about one month (June) out of the year. During part of the remaining months, other species of fish and some vegetables are canned.

In 1955, Japanese fishermen caught 387 million pounds of salmon of which 268 million pounds were from factoryship-type high-seas gill-net fishing and 119 million pounds were from coastal fishing and inshore fixed-net fishing. The latter type of fishing yielded a catch of 2.4 million pounds. In 1955, the Japanese Government licensed 1,700 sets of fixed nets and 1,800 coastal and high-seas fishing boats.

The coastal salmon catch is important both for canning and for domestic consumption as fresh and salt fish. The high-seas factoryship-type catch is canned, chiefly for export, while the drift-net catch by small boats (nonmothership type fishing) is almost all consumed as salt fish on the domestic market. The industry is of considerable importance both as a source of needed protein for the Japanese and as a source of foreign exchange in addition to its importance in supplying employment for some 65,000 fishermen, points out the August 9 report from the United States Embassy in Tokyo.

Some of those interviewed in Hokkaido seemed to have first-hand knowledge about Russian salmon fishing in the Okhotsk Sea and the Kamchatka peninsula area and all stated that Russian methods are primitive (mainly fixed-net fishing) and that the industry is of insignificant importance to the Russian economy. Furthermore, the Russian contention that the salmon stock is decreasing because of heavy Japanese hauls was said to be entirely unfounded.



Republic of Korea

MARKET FOR MARINE-ANIMAL OILS: Trade in marine-animal oils, both in terms of domestic production and imports, is of minor importance to South Korea, according to a survey made by the Foreign Agriculture Service of the United States Department of Agriculture.

Domestic production consisted of 270 metric tons of fish-liver oil and 30 tons of whale oil. The fish oil is produced in small quantities at a few scattered fish-processing plants. It is possible that the production of oil from marine-animals will increase in the future due to the program now under way to develop latent fishery resources.

The only exports of oils and fats reported in 1955 were 73 tons of marine-animal oils to Japan. Prices at the wholesale level in 1955 were US\$30 for a 180-kilogram (about 398 pounds) drum for fish-liver and fish-body oils and US\$40-50 a drum for sperm oil.

No imports of marine-animal oils were listed as such in 1955 and 1954. However, some small quantities may be included in unclassified groupings of fats and oils.

Note: Values converted at the rate of 500 hwan equal US\$1,



Norway

CANNED BRISLING SARDINE EXPORTS LOWER, JAN.-JULY 1956: During the first seven months of 1956 Norwegian exports of canned brisling sardines have been reduced to only one-half of normal, or to about 20 million kroner (US\$2.8 million) in value, points out an October 5 report from the United States Embassy at Oslo.

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FINDINGS IN STUDY OF ARCTIC-NORWEGIAN COD: A comprehensive report on the Arctic-Norwegian cod, published by the Norwegian Fishery Directorate's Ocean Research Institute, contains several noteworthy findings. It reveals that such fish species as cod and haddock, until now considered typical groundfish, probably spend most of their life at higher levels, suggesting the need for a radical revision of Norwegian fishing methods. The study also indicates that the notable decline in the catch of mature cod on the Lofoten banks of North Norway is, in all likelihood, caused by the heavy international trawling in the Barents Sea, feeding grounds of the young cod.

The report presents scores of echographs which conclusively show that cod and haddock to a large extent occur pelagically in big schools. And, contrary to previous notions, they move mostly at upper levels of the sea, not along the bottom. In author Saetersdal's opinion, it is possible that these species are found at the bottom, where they can be caught by trawls, only in relatively short periods. In view of the discovery that cod and haddock spend most of their time at upper levels, he emphasizes the urgent need of developing new fishing methods. Towards that end, the Ocean Research Institute will dispatch an expedition this fall to test the efficiency of float-lines and midwater trawls in pelagic fishing. Meanwhile, the experimental depth-sounding studies of cod and haddock will continue.

A substantial part of the report deals with the wide fluctuations in the stock of the Arctic-Norwegian cod. Since 1860, total landings in the annual Lofoten fisheries have varied between 6 and 40 million mature cod. Comparisons between the Lofoten landings and the number of young cod caught in the subsequent Finnmark fisheries indicate a direct connection, for every fluctuation in the Finnmark fisheries is invariably repeated in the Lofoten fisheries three years later. On the basis of available data, the author offers tentative forecasts for the next two years. The Finnmark fisheries, which were "very good" this year, will be "good" in 1957 and "not so good" in 1958. For the Lofoten fisheries, the catch will be "medium" in 1957, and "above medium" in 1958 and 1959. These predictions do not take into account the extremely high mortality to which the cod spawn are exposed on the banks off the Lofoten islands.

Perhaps the most important chapter in the report is that dealing with the impact of international trawling on the stock of young cod in the Barents Sea, a shallow part of the Arctic Ocean lying northeast of Norway, between Spitsbergen, Franz Joseph's Land, and Nova Zemblia. In this connection the author notes that no less than 700,000 metric tons of gutted Arctic-Norwegian cod was landed by the four leading fishery nations in that area in 1955, an increase of about 100,000 tons compared with 1954. The catch was distributed among the various countries as follows: Soviet Union 350,000 tons; Great Britain 180,000 tons; Norway 160,000 tons; and Germany 10,000 tons. The Soviet catch is estimated on the basis of a few meager data. Thus, it is known that in the spring of 1955 the Soviets were fishing in the Barents Sea with 560 trawlers, including 14 modern factory vessels. In the following five years, the Soviet fishing fleet in these waters was scheduled to be expanded by 75 more factory trawlers. Commenting on these developments, Saetersdal observes: "There is every reason to ask whether the stock of young cod in the Barents Sea can stand being taxed so heavily, and even more, whether it will be able

to endure the further increase in the taxation that can be expected, especially from the fast-growing Soviet fishing fleet."

The Norwegian fishery consultant points out that in recent years the Lofoten fisheries have yielded notably poorer annual catches than indicated by known data on the stock of young cod and the former relationship between young and mature cod. According to Saetersdal, the drop in the Lofoten landings is very likely a result of the heavy increase in the Barents Sea trawling. As this trend will probably continue, he suggests that Norwegian fishermen should in coming years devote more attention to catching the young cod, which are less vulnerable to overfishing than the mature cod found in the Lofoten waters.

Although it can not be asserted that the Barents Sea cod stock is as yet being overtaxed, the question of regulating the trawling operations there is, nevertheless, being considered by Norwegian and British experts. With the present 11-centimeter (4.3-inch) wide mesh, trawls can catch 40-centimeter (15.7-inch) long fish. As these have no commercial value, they are thrown overboard. The salt-fish trawlers even reject most of the fish under 60 centimeter (23.6-inch). If the width of the trawl mesh were to be enlarged, it would spare the younger generations of cod. The Soviet Union, however, is not a member of the international group which seeks to assure the biggest possible fish yield in the North-East Atlantic. And without Soviet participation, says the report, protective measures will have little effect. (News of Norway, September 20, 1956, of the Norwegian Information Service.)

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FOREIGN MINISTRY REQUESTS NORWAY FISHERY PACT WITH RUSSIA: The Norwegian Foreign Ministry through the Norwegian Embassy in Moscow has approached the Soviet authorities with the suggestion that negotiations should be started with the aim of securing agreement on a frontier between Norwegian and Russian sea territory, it was announced in Oslo in September.

According to the Oslo newspaper <u>Arbeiderbladet</u>, it is hoped to establish a joint-fishing belt where Norwegian and Russian fishing vessels can operate side by side. Such an arrangement already exists between Norway and Sweden at the outer reaches of the Oslo Fijord.

Last week four Russian trawlers were discovered within Norwegian waters. Damage was done to Norwegian fishing gear. The Norwegian Embassy in Moscow has asked the Soviet authorities to draw Russian trawler skippers' attention to the Norwegian regulations so that similar contraventions can be avoided in the future. (The Fishing News, September 14, 1956.)

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PELAGIC PURSE-SEINING FOR COD BEING TESTED: The Norwegian fishing vessel Longva recently left the west Norway port of Aalesund to test the superefficient purse seine on the banks off western Greenland. According to the findings of Norwegian ocean researchers, these waters are teeming with cod for about three weeks every summer. If the pelagic purse-seining experiment is successful, it may persuade Norwegian fishermen to consider a radical change in their methods, states the Norwegian Information Service in its August 23 News of Norway.

According to Dr. Birger Rassmussen, of the Norwegian Fishery Directorate's Ocean Research Institute, the waters west of Greenland constitute one of the richest fishing grounds in the world in relation to the effort required. As to the enormous concentration of cod that occurs each summer, he says it is directly caused

by the sinking of cold melt water from the drift ice. To get away from it, the cod follows the warmer water to the surface. "They go in dense shoals, just like herring," he reported on the return from his last study cruise.

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PLAN TO ADVERTISE FRESH FISH. The Norwegian National Association for the Marketing of Fresh Fish agreed at its recent annual meeting to urge the Ministry of Fisheries to effect an advertising campaign to sell more fresh fish in the domestic markets. The sale of fresh fish has declined in recent years. To finance the campaign, the payment of a tax of $\frac{1}{2}$ for per kilo (about 32 U. S. cents a hundredweight) on all fresh fish sold in the domestic market is proposed. The distributors and not the consumers would pay the tax, according to a September 7, 1956, report from the United States Embassy at Oslo.



Pakistan

FROZEN FISH EXEMPTED FROM EXPORT DUTY: Fresh fish frozen in cold storage under low temperatures before export is exempted from export customs duty, according to Customs Notification in the Gazette of Pakistan dated August 31, 1956. Under Item 10 (i) of the Second Schedule of the export tariff fresh fish was chargeable at the rate of Rs. 5/- per maund (82 pounds).

In a previous notification dated March 4, 1955, the Government of Pakistan in an effort to expand the country's export of fish withdrew the duty on fresh fish processed and frozen before export.

The effect of the present notification means, therefore, that all frozen fresh fish, whether processed or not, is permitted to be exported free of export duty, points out a September 7 United States Embassy dispatch from Karachi.



Portugal

COD FISHING FLEET REPORTS GOOD CATCHES ON NEWFOUNDLAND AND GREENLAND BANKS: The fish catch by the Portuguese fleet on the Newfoundland and Greenland banks has been unusually large this year, points out a United States dispatch from Lisbon (September 6, 1956). Modern equipment for locating schools of fish was mentioned as an important aid, as well as quick work in fitting out dories and the greater speed by which motor-powered vessels are able to follow the fish. Better catches were made because of the use this year of better and more expensive bait purchased from suppliers in Nova Scotia, Newfoundland, and Norway. It was reported that fresh mackerel, as well as squid and herring were used with special success as bait.

Almost all vessels of the cod fleet were reported returning fully loaded this year a month or so ahead of the usual schedule and many units of the fleet of 70 to 80 vessels were expected to return to the banks for further fishing. Fish have not been as abundant on the banks for many years, according to returning fishermen. Both trawlers and hand-line fishing vessels have met with considerable success.

An abundant cod catch should be of substantial assistance in increasing Portugal's protein food supplies and assisting the Government in efforts to maintain

stable prices at a time when the cost of living had risen. The demand for cod since last year to fill the gap in meat supplies resulted in substantial imports of cod from Norway and other supplying countries with a corresponding loss in foreign exchange.

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FISHERIES TRENDS, JUNE 1956: Sardine Fishing: Sardine catches in Portugal during June 1956 improved over the very low landings for May but were still well below normal. The catch of sardines for June 1956 amounted to 1,522 metric tons (value US\$329,000) as compared with 5,917 tons (value US\$655,000) in June 1955. Sardines purchased by the packing centers during the month amounted to only 655 tons (valued at US\$169,600). The balance was absorbed for immediate public consumption. The principal sardine ports in June were Portimao, Olhao, Matosinhos, and Villa Real Santo Antonio. About 53 percent of the catch was landed at Portimao. The port of Matosinhos had about 138 tons, the August 1956 Conservas de Peixe reports.

Other Fishing: Landings of fish other than sardines totaled 5,879 metric tons (valued at US\$974,713 ex-vessel) and consisted principally of anchovy (1,995 tons) and chinchard (3,008 tons) and 876 tons of mixed (mostly tuna and mackerel).

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CANNED FISH EXPORTS, JANUARY-JUNE 1956: Portuguese canned fish exports in June 1956 totaled only 2,173 tons (114,000 cases), valued at US\$1.3 million,

Portuguese Canned Fish Exports, January-June 1956								
Species	January-June 1956							
Sardines in olive oil Sardinelike fish in olive oil Sardines & sardinelike fish in brine Tuna & tunalike in olive oil Tuna & tunalike in brine Mackerel in olive oil Other fish	Metric Tons 13,838 2,125 562 470 124 680 236	1,000 <u>US\$</u> 7,274 1,840 108 383 69 421 111						
Total	18,035	10,206						

For January-June 1956, the leading canned fish buyer was Germany with 3,217 tons (valued at US\$1.7 million, followed by the United Kingdom with 2,024 tons (valued at US\$1.1 million), the United States with 2,004 tons (valued at US\$1.6 million), and Italy with 1,883 tons (value US\$1.1). Exports to the United States consisted of 843 tons of sardines, 997 tons of anchovies, and 10 tons of tuna.

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CANNED FISH PACK, JAN. -APRIL 1956: The Portuguese canned fish pack (811 tons) in April 1956 continued very light and consisted of principally sardine

like fish. The canned fish pack for January-April amounted to 1,740 tons (91,600 cases), the August 1956 Conservas de Peixe points out.

Note: Values converted to US\$ equivalent at rate of 28.75 escudos equal US\$1.

as compared with 4,480 tons, valued at US\$2.1 million, for the same month in 1955.

For the first six months of 1956, canned fish exports amounted to 18,035 tons (949,000 cases) valued at US\$10.2 million as compared with 27,292 tons valued at US\$14.0 million for the same period in 1955. Sardines in olive oil was the leading product exported.

In June 1956 France was the principal buyer of Portuguese canned fish, followed by Germany, the United Kingdom, and the United States.

Portuguese Canned Fish Pack, Jan,-April 1956								
Product	Net Weight	Canner's Value						
In Olive Oil. Sardines Sardinelike fish Tuna Other species (incl., shellfish) In Brine; Sardinelike fish Other species	Metric Tons 574 1,035 45 28 32 28	1,000 US\$ 348 1,055 48 20						
Total	1,740	1,486						

South-West Africa

SKIPJACK TUNA NETTED NEAR WALVIS BAY: The South-West Africa fishing vessel <u>Kittywake</u> reported catching 150 oceanic bonito or skipjack tuna with lampara seines during July. The school of skipjack tuna was encountered, while the vessel was under way from Luderritz to Walvis Bay. Unprepared for fishing, most of the school disappeared by the time the net was set. The crewmen on the <u>Kittywake</u> thought that if the net had been set more quickly that a larger catch would have been made.

The fish averaged about 15 pounds each. When gutted, it was found that their stomachs were full of small white shrimp about three-quarters inch long. The fish apparently did not see the twine while the net was being pursed. It is claimed that the type of synthetic fiber twine used in the net creates very little disturbance in the water. The report also stated that a number of companies at Walvis Bay have inquired about the use of same type of nets used by the <u>Kittywake</u> for such fish as bonito and yellowtail. The skipjack is reported to be uncommon in South Africa, but is fairly abundant off Angola. (<u>South African Shipping News and Fishing Industry Review</u>, August 1956.)



Spain

FISHERIES TRENDS, AUGUST 1956: Fishing: Fish catches sold on the Vigo fish exchange during August 1956 totaled 11.7 million pounds valued at US\$1,074,148, a decrease in quantity of about 12.7 percent as compared with July and 23.7 percent below August 1955. Average prices for first sales in August were 9.1 U. S. cents a pound as compared with July and 23.7 percent below August 1955. Average prices for the first sales in August were 9.1 U. S. cents a pound as compared with 10.9 U. S. cents in July and 5.5 U. S. cents in August 1955.

The lower average prices in August were probably due to smaller catches of high-priced varieties, such as albacore tuna (Germo alalunga) and to a greater abundance of the low-priced needlefish (Ramphistoma belone) and horse mackerel (Sciaena aquila lacep). The catch of albacore decreased from 5.6 million pounds in July to 1.8 million pounds in August. The average price for albacore was 14.5 U.S. cents a pound in July and 16.8 U.S. cents a pound in August.

Fish Canning: During August the fish canneries in the Vigo area purchased 3.7 million pounds of fresh fish at the Vigo fish exchange as compared with 4.9 million pounds in July and 5.4 million pounds in August 1955. The decrease in purchases by comparison to July was attributed in part to the lower catches of albacore. Other varieties purchased by fish packers wore needlefish, which is packed in oil as a substitute for sardine (Sardina pilchardus W.) and horse mackerel.

Reports indicated that some fish packers were curtailing purchases of fresh fish on account of the difficulties encountered in obtaining an adequate supply of tin plate and olive oil. The fish canning industry regards this as its main problem at the present time, and little seems to have been done officially toward a satisfactory solution (September 11 dispatch from United States Consulate in Vigo).

Note: Value converted at one pessate equals 2,56 U, S, cents.



Sweden

CARE OF FROZEN FOODS STRESSED BY HEALTH AUTHORITIES: Frozen foods and the so-called "freezing chain" were discussed thoroughly by the Swedish General Health Association at a three-day conference held in September at Halsingborg, Sweden. The Association membership consists of Swedish health authorities, district physicians, and veterinary surgeons, according to a September 17 report from the United States Consulate at Goteborg.

The Association considers that quick-frozen foodstuffs should be better taken care of by wholesalers and retail dealers and recommends more rigorous regulations regarding sanitary conditions in shops.

Dealers, the Association stated in a resolution adopted at the conference, must learn to measure the temperature of the quick-frozen goods. The importance of shipments in wholesale lots was also stressed. The resolution also said that shop freezing, whereby fresh foodstuffs are placed in freezing counters in retail shops, must be prevented. It was also held to be desirable that the manufacturers should date-stamp foodstuffs particularly shrimp, fatty types of fish, etc.

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IMPORTS FROM THE DOLLAR AREA LIBERALIZED: The Swedish State Agricultural Marketing Board (Statens Jordbrukensnamnd) in a circular announcement of August 7, 1956, corrected the dollar-free list and the transit-dollar simport lists. The dollar-free list (commodities within the jurisdiction of the Board which can be admitted to Sweden without import license from dollar-area countries) includes the following fishery and related products (statistical number precedes the commodity in parentheses): (33) fresh halibut; (38) fresh rayfish; (46,50-51) salted and dried fish, excluding sprats, anchovies, mackerel, herring and Baltic herring (stromming); (54) spiced or sugar-cured fish, excluding sprats, anchovies, herring and Baltic herring; (55) dried fish (fresh-dried fish), excluding ling; (56) smoked fish; (57-59) fish roe, salted or prepared in another manner; (60) oysters; and (62, ex 63) crustaceans (as well as unspecified mussels), excluding lobster and deep-sea shrimp; (76) tortoise shell, mother-of-pearl, also mussel and snail shells, unworked; (315-317) canned fish and shellfish.

The transit-dollar list (commodities originating in the dollar area for which import licenses are granted) includes (251) fish-liver oil; (252:2) fish oil, other kinds; (ex 253:2) lard oil and sperm oil; and (ex 281) crayfish tails (United States Embassy dispatch dated August 31, 1956).

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LOAN PROGRAM FOR COMMERCIAL FISHERMEN: A program for the granting of loans to Swedish fishermen and owners of commercial fishing vessels has been in existence for about 50 years. Loans are granted for the purchase of vessels, motors, or other machinery, gear, and for shore-side equipment, such as packing buildings, vehicles, and fish culture.

Funds for loans are controlled by the Swedish Board of Fishery. The Board does not make loans directly to fishermen or owners of fishing vessels but to economic associations and county councils throughout the country, who in turn extend loans to the fishermen or owners of vessels within their jurisdiction or membership.

No installments or interest are required during the first two years, but thereafter an interest rate of 3.6 percent is charged on the amount of the outstanding loan. Loans must be repaid within a period of 12 years, with equal payments each year after the first two, plus accrued interest. When yearly installments are not paid within the specified time, an interest of 6 percent is charged from the due date, until payment is made, according to a September 18, 1956, dispatch from the United States Consul General in Goteborg.

The maximum amount that may be granted in a single year by rural economic associations or county councils to an individual fisherman or to an individual owner of a vessel is US\$23,000. The Swedish Government contributed US\$387,000 annually to the fund during 1950-53, US\$580,000 in 1954, US\$ 773,000 in 1955 and US\$503,000 in 1956.

The average loan extended by the economic associations and county councils amounts to between US\$1,900-3,900. The demand for loans has steadily increased during the past few years. The restrictive credit policy established by the Swedish Government in 1956 has reduced the amount made available to the fishery fund in 1956.

* * * * *

NEW FISH FREEZING FACILITIES PROPOSED FOR GOTEBORG: The Swedish West Coast Fishermen's Fish Processing Association has applied to the Swedish government for a loan of 1.5 million crowns (US\$291,000) for the erection of a building for the processing and quick-freezing of fish. In considering this loan application, the Fishing Board is reported to have suggested that the amount of the loan be reduced to 700,000 crowns (US\$136,000), states a September 19, 1956, dispatch from the United States Consulate in Goteborg.

It is calculated that the total cost will amount to about 6.5 million crowns (US\$1,260,000). The building itself is estimated to cost 4.35 million (US\$843,000). The structure is to be built at the western end of the fish harbor and it is expected that about 200,000 crowns (US\$38,000) will be contributed by the Goteborg harbor authorities for pulling down the buildings at present occupying this area. The Association hopes that it will be possible to raise about 5 million crowns (US\$989,000) among the fishing industry organizations.

The buildings to be erected will contain five floors. It will be 171 feet long and 85 feet wide and will have a roof garden. It will contain a deep-freeze plant, premises for the processing of fish, including filleting machines, cold-storage rooms, and office quarters.

It is planned that the deep-freezing capacity will be 50 metric tons a day. If this capacity is utilized 120 days a year, this would mean that 6,000 metric tons annually would be frozen. It will be possible to keep about 1,200 metric tons in cold storage, corresponding to an average storage period of two months.

According to the chairman of the Association, it is essential for the continued existence of the Swedish west coast fishing industry that this building be erected. At present, the possibilities of freezing fish landed in the port of Goteborg are very limited, and the fish often have to be transported long distances for this purpose, for instance to Malmo which is about 186 miles from Goteborg.

Another reason why the realization of this project is considered so important is that Swedish imports of quick-frozen fish have increased enormously during the last few years. In 1954, about one-half of the frozen fish consumed in this country was Swedish, while in 1955 only one-third was of Swedish origin.

The consumption of fresh and frozen fish totaled approximately 80,000 metric tons in 1955, expressed in terms of the weight of the fish when landed.

A striking development in the consumption of fish in Sweden during recent years has been the increase in the consumption of quick-frozen fillets. From an insignificant part of the total fresh fish consumption in earlier years the quantity reached 10 percent of total consumption in 1954 and approximately 20 percent in 1955, which means that in that year about 16,000 metric tons of quick-frozen fish was consumed.

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WORKMEN'S COMPENSATION ACT COVERS FISHERMEN: The commercial fishing vessels of Sweden are predominately operated by their owners on a share basis, and seldom have hired crews. While there are about 12,000 full-time and 7,000 part-time professional fishermen engaged in sea fishing, only a few worked for wages in 1955.

The few hired fishermen are covered by the Workmen's Compensation Act of 1954, generally referred to as "The Occupational Injuries Insurance Act," which went into effect on January 1, 1955. Insurance under this Act is compulsory for all persons employed in Sweden (Swedish citizens and aliens, private and public employees). The cost is met by employers' premiums which are set in relation to the work hazards of the plant or industry concerned. Occupational injuries insurance is coordinated with general compulsory sickness insurance, the sickness insurance funds taking care of cases of occupational injuries (work accidents and occupational diseases) causing disability up to 90 days. Sickness insurance is financed by policy holders' State subsidies, and employers' premiums (1.4 percent).

The general rules governing insurance of the self-employed also apply to the self-employed fishermen:

- 1. Under the General Compulsory Sickness Insurance Act the self-employed are entitled to compensation for the cost of medical treatment and hospitalization to the same extent as employees, and to a basic daily allowance of about 58 U. S. cents which can be increased by a supplemental insurance. For employees, supplemental insurance is compulsory.
- 2. Under the Occupational Injuries Insurance Act they may take out voluntary insurance providing the same benefits as the compulsory insurance of employees. Voluntary insurance may also cover accidents off the job. Voluntary insurance policies are written by those companies administering compulsory occupational injuries insurance, primarily the National Insurance Office, either individually, or collectively for the members of Swedish professional organizations or trade unions.

Prior to the coming into effect of the new legislation in 1955 there was a Royal Decree of 1918 enabling fishermen to take a voluntary State-subsidized individual accident insurance with the National Insurance Office. This insurance was cheaper than the voluntary insurance under the Occupational Injuries Insurance Act of 1954 and benefits were lower--10,500 fishermen held such insurance policies in 1954.

According to information furnished by the National Insurance Office 6,071 fishermen are at present holding occupational injury insurance policies through their professional associations. Eleven fishermen's associations have signed insurance contracts on behalf of their members, one of them, the Swedish West Coast Fishermen's Association representing 5,191 policyholders. In addition, there are fishermen taking individual insurance policies, but they are few.



Turkey

MARKET FOR MARINE ANIMAL OILS: From the standpoint of both production and foreign trade, marine oils are of minor importance to Turkey's economy, according to an April 27, 1956, dispatch from the Foreign Agricultural Service of the U.S. Department of Agriculture.

The only marine oil produced in Turkey is that derived from the Dolphin (marine mammal). Production from this source totaled 2,500 metric tons in 1954 and the 1955 production was estimated at 1,500 tons. Exports of marine-animal oil were not classified as to type and consisted only of 464 metric tons, principally to Czechoslovakia, Somaliland, and Bulgaria. No marine animal oils were imported.



Union of South Africa

CENTRAL SALES ORGANIZATION FOR CANNED FISH SET UP: Production and sales of canned fish by nine companies, representing four of the largest groups in the fishing industry of South and South-West Africa, have formed a central sales organization to be known as Federal Fish Packers Ltd. Announcing this merger, the South African Shipping News and Fishing Industry Review says its information is regarded by the South African fishing industry as "one of the most significant developments yet in the eventful history of fish canning on the West Coast. It represents the culmination of a number of previous attempts to achieve some forum of coordination in the sales of canned fish from the inshore fishing industry.

"It is no secret that the fish canners of South and South-West Africa have been feeling the pinch of intense competition on the world markets for their products," says the paper. "This in turn has revealed obvious weaknesses in the present system whereby each of several companies has acted on its own in markets abroad."

Although several companies remain outside the new combine, the organization represents a very substantial section of the fish canning industry with 7 spiny lobster canneries. The combined firms' investment in factories, boats, and other equipment is nearly half the total investment in the inshore fishing industries of South and South-West Africa.

* * * * *

ECHO-SOUNDERS IN DEMAND BY FISHING FLEET: Echo-sounders for locating fish in Cape waters were in such demand in the Union of South Africa that they were being flown from Europe to Cape Town for the fishing fleets. These sounders were then installed in vessels fishing off the Cape's west coast. In six weeks from June to the end of July, one Cape Town firm alone received orders for 60 echo-sounders; while others were able to sell every instrument in stock. Reportedly, the suddendemand was so insistent that many instruments were flown to Cape Town from overseas, principally from Germany.

According to fishing concerns in Cape Town, this surge towards echo-finders is the start of a new era in scientific fishing. Fishermen in South Africa reportedly to date relied primarily on their skill and experience to reap their catches while the fish were plentiful, but for the past two seasons the movement of the shoals has been erratic and elusive, states a dispatch (August 2) from the United States Consulate at Cape Town.

Factory operators and fishermen on the Cape west coast in investigating more exact methods for locating shoals of fish now are finding the answer to some of

their problems in the echo-sounder. It is understood that echo-sounders have been in use for some years now in the trawling fleets and in the live-fishing boats of Natal and the Cape east coast and have been a most worthwhile investment.

Echo-sounders currently being sold are principally from Kiel, Germany, marketed at approximately ± 300 (US\$840) each.

In 1952, when the Cape West Coast is said to have reached a peak of 300,560 tons of fish, a few fishermen reportedly tried out the echo-sounders with marked success. By the end of August this year, it was estimated that about 70 Cape Shoal fishing boats would be equipped with echo-sounders.

* * * * *

PILCHARD-MAASBANKER CATCH THROUGH JUNE 1956 POOR: A poor pil-chard-maasbanker (jack mackerel) season has hit the 16 factories and 220 fishing boats of the Union of South Africa's west coast. This year the fish have not been

Union of South Afri			Catches,							
January-May 1956 With Comparisons										
Period	Maasbanker	Pilchard	Total							
	, (Short Tons)								
1956:										
January	23	3,634	3,657							
February · · · · ·	593	7,316	7,909							
March	690	24,089	24,779							
April	3,382	20,179	23,561							
May	7,993	2,970	10,963							
1955:										
January	4,730	35	4,765							
February	15,546	22,468	38,014							
March	2.324	47,905	50,229							
April	23,129	9,032	32,161							
May	25,539	17,080	42,619							
Tanuary-May 1956	12,681	58,188	70,869							
January-May 1955	71,268	96,520	167,788							
12 Months 1955	86,885	134,424	221,309							
12 Months 1954	130,228	97,336	227,564							
12 Months 1953	93,140	150,987	244,127							

coast. This year the fish have not been running and for six months boats have searched, too often in vain, for the elusive pilchard and massbanker. The total catch of pilchards and massbanker from January until the end of May 1956 was only 70,869 short tons and June did not add very much to this total.

Some relief has come from a better than average catch of mackerel which, by the end of May, had reached 28,740 tons. Mackerel does not count in the 250,000-ton quota for the Cape west coast and so the industry has nearly 180,000 tons of pilchards and maasbanker to catch from the beginning of June until the end of the year. The former closed season is no longer enforced and the boats fish until the quota is reached or the year ends.

By early July there were fair indications that the worst period may well be

over. One hopeful sign has been a slight rise in the sea temperature.

Warmer water might well bring them back. In the meantime factories and fishermen are eking out the season as best they can. A constant search is going on and the familiar areas have been thoroughly combed. In addition, the fishing companies engaged the services of a light aircraft which made a number of spotting trips over St. Helena Bay and further south, but results up to the end of June had been "negative."

Another and even more practical way of easing the shortage was found by a number of the larger and more powerful boats. Big shoals of fish appeared in False Bay and so these boats traveled south, rounded Cape Point, and went in and caught them. The furore subsequently raised by False Bay fishermen resulted in the closing of the Bay to pilchard and maasbanker netting.

With catches low, some of the factories are reported to have temporarily closed canning lines. But these would soon come into full operation if the fish return with a rush.

The most significant figures are those for maasbanker. In the first five months of this year, usually the best maasbanker months, the catch was 12,681 tons, compared with 71,268 tons during the same period last year.

In the first five months of this year, 58,188 tons of pilchards were caught, compared with 96,520 tons over the same period last year.

The total catch of pilchards and maasbanker until the end of May this year was, therefore, less than half the total of 167,788 tons for the same period last year (see table).

But while the Cape fishery is having a poor season, Walvis Bay in South-West Africa has had excellent catches. In the season which started in February, a total of 122,222 tons of pilchards had been caught by the end of May as compared with 80,878 tons landed by the end of May last year. The season last year did, however, start a month later, in March. As in the Cape, Walvis Bay has a quota of 250,000 tons and fishing stops when this figure is reached, which is likely to be well before the end of the year, states the July 1956 issue of The South African Shipping News and Fishing Industry Review.

A later dispatch, dated September 7, from the United States Consulate in Cape Town states that fishing in Union waters improved during July and August. Canned fish production was also high; demand for canned fish particularly in the United Kingdom, remained firm and large quantities were exported.

* * * * *

FISHERIES TRENDS, AUGUST 1956: Overseas demand for South African fish oil was strong during August and exports of fish oil were limited due to heavy commitments of the South African fish-oil industry

Canned and frozen spiny lobster production was seasonally low due to very unfavorable weather; however, with a strong overseas demand, particularly from the United States, stocks of canned and frozen spiny lobster held by South African companies were quickly liquidated.



U.S.S.R.

MURMANSK--A MAJOR FISHING PORT: Forty years ago there was no Russian ocean fishery off the Murmansk coast in the Barents Sea. Today Murmansk is is one of the world's largest fish harbors and a base for 500 modern fishing vessels, according to a report in Dansk Fiskeritidende (August 17, 1956), a Danish fishery periodical. Most of the vessels are large trawlers, but about 50 fish for herring with gill nets. There are large repair yards for the fishing fleet. Last year Murmansk received 640,000 metric tons of fish--which reveals how much the Soviet Union has expanded its ocean fisheries in less than two-score years.

There are large fish-processing plants in Murmansk--filleting plants, smokeries, and canneries--but the daily supply of fish is so large that a part must be sent elsewhere for further handling.

Large quantities of fish are sent to Moscow by airplane or in refrigerated cars attached to express trains. The quality of the fish is first class when it reaches Moscow, where the demand is great and the prices good.

It is noteworthy that the Murmansk trawlers, because they are very particular about the quality of the fish, do not remain at sea longer than 7 days.



Fish are handled in Murmansk in a sanitary and effective manner. Automatic conveyors are widely used. Much is done to produce various types of canned fish. There is a large production of fish cooked in oil, and there are many types of smoked fish produced.

Fishermen on the large ocean vessels, which are owned by the State, receive a fixed wage and a certain percentage of the catch. A fisherman can earn from 35,000 to 60,000 rubles (the approximate equivalent of US\$1,400-2,000) a year.

The Soviet Union has no problems whatsoever in disposing of the catches. All fish landed can be sold within the boundaries of the country and the quantity could be doubled many times. Thus, the Russian ocean fleet could be increased almost endlessly. Expansion is occurring currently to such a great degree that it is only a question of time until the Soviet Union can supply all its needs.



United Kingdom

CANNED SARDINE MARKET: The production of sild, pilchard and brisling, the sardinelike fish canned in the United Kingdom, amounted to 3,646 short tons in

Table 1 - United Kingdom's Catch of Sardinelike Fish,								
Species	1955	1954	1953					
	(Short Tons)							
Brisling	503	347	290					
Pilchards	2,077	1,232	2,326					
Sild	1,066	806	524					
Total		2,385	3,140					

f Sardinelike Fish,

1954 1953
(Short Tons)
347 290
1,232 2,326
806 524
2,385 3,140

1955 as compared with 2,385 tons in 1954 (table 1). The importance of this production is relatively small in terms of total consumption and in terms of the total catch of the entire British fishing industry. As might be expected, however, pro-

duction of sardinelike fish has some local importance, namely in Cornwall, where the pilchard-canning industry has been a growing one since World War II.

Although some sardines are canned in the United Kingdom, the quantity is insignificant. Only fish of the European varieties of immature pilchards may be sold

Table 2 - United Kingdom's Supply of Canned Sardinelike Fish, 1954-55										
T	Sard	ines	nes Brisling		Pilchards		Sild		Total	
Type	1955	1954	1955	1954	1955	1954	1955	1954	1955	1954
		(Short Tons)								
Domestic pack	-	-	256			2,077		584	3,028	2,781
Imports	6,682	8,110		1,888		4,002		315	16,485	14, 315
Total Supply	6,682	8,110	1,203	2,008	10,708	6,079	920	899	19,513	17,096

as sardines in the United Kingdom, an August 27 dispatch from the United States Embassy in London states. (The Embassy understands that this ruling arose out of litigation in 1915 involving a Newcastle firm and a Norwegian product. According to a source in the Ministry of Agriculture, Fisheries and Food, Maine and California sardines are known in the United Kingdom only as pilchards.)

Consumption trends for canned sardinelike fish have been upward (see table 2), probably because of the shortage of canned salmon. Supplies of pilchard from the Union of South Africa and South-West Africa were three times as great in 1955 as supplies of imported canned pilchard from all sources in 1938. There is a demand for "true" sardines, and its satisfaction depends to a large extent on a good Portuguese pack.

Table 4 - Retail Prices of Sardinelike Fish in London Area, Mid-1956													
					Price Pe								
Product	Origin	Packing Medium	Type of Can	Weight	British Currency	U. S. Currency							
Pilchards	South Africa """ British "" South Africa South-West Africa	Natural Tomato " " " " " " " "	Tall Oval " Tall " Oval	8 oz. 1 lb. 1 lb. 7 oz. 14 oz. 9½ oz. 15 oz. 1 lb. 8 oz. 15 oz.	s. d. 1s. 4d. 1s. 8d. 1s. 1d1s. 3d. 1s. 1d. 6d. 2s. 1s. 5d. 1s. 5d. 1s. 4d.	¢ 14 19 23 15-17 26 21 28 20 14							
Sardines	Portugal " France " "	Olive oil or tomato Olive oil """ """ """ """ """	Flat rectangular		1s. 4d. 1s. 1d1s. 6d. 2s. 3d2s. 6d. 1s. 7d. 3s. 6d. 6s. 6d. 2s. 3s. 9d.	15-21 32-35 22 50 91 28 52							
Sild	Norway " British	Olive oil or tomato Olive oil Tomato	H H	$3\frac{3}{4}$ oz. $3\frac{3}{4}$ oz. $1\frac{1}{2}$ oz. $3\frac{3}{4}$ oz.	1s. 6d1s.11d. 1s. 1d. 8d. 1s. 1d.	21-26 15 9 15							
Brisling	Norway	11	11	34 oz.	1s. 10d.	26							
Herring {	British	ii ii	Oval	7 oz. 4½ oz.	1s. 2d. 10d.	16 11							

The most popular can sizes are:

- (a) Sardines--1/4 club (4-oz. flat rectangular with rounded corners), in olive oil and in tomato sauce; probably represents 80 percent or more of total consumption.
- (b) Pilchard--7-oz. and 8-oz. oval and flat and 1-lb. tall or oval, in tomato sauce with some in brine.
- (c) Sild and brisling-dingley (3³/₄ oz. flat rectangular with rounded corners, mostly from Norway, Denmark, and Holland); packed in oil and in tomato sauce.

There is a very wide variety of canned sardinelike fish, including canned small herrings, on the British market. They are retailed in a wide price range in numerous sizes and shapes of cans up to 1-lb. net. Currency difficulties affect imports from the United States. Present imports come from sterling and soft-currency areas.

Table 3 - Canned Sardinelike Fish Imports into United Kingdom, 1954-56												
Product & Principal January-April 1956			12 Months 1955			12 Months 1954						
Country of Origin	Quantity			Quantity	Value		Quantity	Value				
	1,000 Lbs.	£1,000	US\$1,000	1,000 Lbs.	L1,000	US\$1,000	1,000 Lbs.	£1,000	US\$1,000			
Brisling:												
Norway	82	21	60	1,867	507	1,421	3,760	1,045	2,925			
Denmark	6	1	3	23	4	10	15	3	7			
Other	1	1	1	5	1	2	1	1/	1			
Total	89	23	64	1,895	512	1, 433	3,776	1,048	2,933			
Pilchards:												
Union of South Africa	10	69	193	49	328	919	21	154	431			
South-West Africa .	49	347	973	124	799	2,237	59	374	1,046			
Other	1	1/	1/	1	1/	1/	1/	1/	1			
Total	_60	416	1,166	174	1, 127	3, 156	80	528	1,478			
Sardines:												
France	1	12	34	1/	11	29	2	50	140			
Portugal	25	376	1,053	132	1,842	5,158	147	2,038	5,707			
Yugoslavia	-	-	-	- 1	-	-	3	25	70			
French Morocco	1/	1	3	1/	1	3	8	107	300			
Other	1	6	_15	2	13	36	2	21	59			
Total	27	395	1,105	134	1,867	5, 226	162	2,241	6,276			
Sild:												
Norway	2	37	104	3	63	177	6	121	338			
Other		-	1/	1/	1	3	1/	1/	1/			
Total	2	37	104	3	64	180	6	121	338			
Grand Total	178	871	2,439	2,206	3,570	9,995	4,024	3, 938	11,025			
1/Less than 1,000 lbs., ± 1,000, or US\$1,000.												

Domestically produced supplies go through the normal channels: factory, whole-saler, and retailer. Imports are made by first-hand distributors, brokers, or agents and thence distributed to wholesalers and retailers.

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FISH MEAL PRODUCTION INCREASE SOUGHT: In spite of greatly increased production of fish meal at the English fishing ports of Hull and Grimsby, which produce about 70 percent of Britain's supplies, there are still big deficiencies and the Government spent more than £7 million (US\$19.6 million) in 1955 for imports to meet the demand.

The British Trawlers' Federation believes that this sum could be saved if more incentives to home production could be given, and the matter will be discussed at a federation meeting in September.

It is also felt by the producers of fish meal that they might well be allowed to explore foreign markets with their fish meal, to win new business and thus help in the country's economic position.

Largely because it was felt that British bacon had suffered from the use of inferior meals in feeding, Hull and Grimsby fish meal factories in October 1955 pooled their resources to manufacture a new pure white fish meal, which is sold under one brand name.

This meal was the first to carry a triple guarantee of purity and quality with protein content fixed at 66 percent, with oil and salt at less than 4 percent and 2 percent, respectively.

The two factories produce about 70 percent of the British fish meal output in the ratio of about 40,000 tons annually at Hull to 30,000 tons at Grimsby.

In July 1956 the British Trawlers Federation stated that manufacturers of Hull and Grimsby had given valuable assistance towards Britain's efforts to cut down on imports.

Production and sales had soared to the record level of 26,022 tons in the first six months of 1956, an increase of 32.5 percent, and this increased production meant a reduction in imports of fish meal and a substantial saving in overseas payments. It was a great step forward because, since the war, imports of marine protein had grown year by year.

British trawler owners naturally feel that through the meal factories, which are nonprofit-making companies working on a cooperative basis in the industry, they could completely offset all imports of white-fish meal if it could be made possible for them to catch white fish solely for the manufacture of meal.

Every processor, trawler owner, fish merchant, and curer is a shareholder in the Hull and Grimsby fish meal companies. (Approximately $4\frac{1}{2}$ tons of fish offal is needed to manufacture one ton of white-fish meal.) A continuous process system is worked at the two plants for 365 days a year and between 200,000 and 230,000 tons of surplus fish and trimmings is processed annually, with a maximum of 1,400 tons a day (Fishing News, September 14).

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INTEREST RATES ON LOANS FOR VESSELS AND GEAR INCREASED: The British White Fish Authority has announced that, as a result of a recent rise in the rates of interest charged to them by the Treasury, their own rates of interest will be increased on loans effective August 30, 1956. The new rates are: on loans for not more than five years, $5\frac{1}{4}$ percent; on loans for more than five years but not more than 15 years, $5\frac{1}{4}$ percent; on loans for more than 15 years, $5\frac{1}{2}$ percent.

The other terms and conditions of the Authority's arrangements for loans are unchanged according to <u>The Fishing News</u>, September 7, 1956.

The Authority's loans are connected with the building of new fishing vessels of not more than 140 feet; the purchase, in certain circumstances, of new engines and nets and gear for inshore vessels; the construction and equipment of processing plants; and the formation and development of cooperative organizations.

Interest rates previously payable of $4\frac{3}{8}$ percent for loans up to five years, and $4\frac{3}{4}$ percent for those of more than five years, became effective on August 13, 1955. A previous increase to 4 percent and $4\frac{1}{2}$ percent, respectively, had taken place only a few weeks earlier on July 9, 1955.





Department of the Interior

FISH AND WILDLIFE SERVICE

FISHERIES LOAN FUND ACTIVITIES INITIATED:

Terms and conditions for the granting of loans under the newly-created fisheries loan fund, authorized by the Fish and Wildlife Act of 1956, were announced October 17, 1956, by the Secretary of the Interior. The loan fund will be administered by the Fish and Wildlife Service.

The regulations establishing the required administrative procedures were published in the <u>Federal Register</u> on October 18.

The loan fund was created under the authority of the new Fish and Wildlife Act, approved by the President on August 8, which empowered the Secretary of the Interior "to make loans for financing and refinancing of operations, maintenance, replacement, repair, and equipment of fishing gear and vessels, and for research into the basic problems of fisheries." Loans cannot be extended for any phase of a shore operation.

Secretary Seaton explained that the rate of interest on all loans granted is fixed at five percent per annum. The period of maturity of any loan shall be determined and fixed according to the circumstances, but in no event can it exceed a period of 10 years.

Loan application forms and instruction sheets for filling out the forms, plus a copy of the regulations, became available from the Fish and Wildlife Service beginning October 22. The Act authorized \$10 million to provide initial capital as a revolving fund for these loans. Under the terms of the Act, a loan may not be granted unless reasonable finan-

cial assistance applied for is not otherwise available on reasonable terms.

Persons in the United States and territorial possessions who desire loans should obtain an application form and instruction sheet from the nearest Fish and Wildlife Service Fishery Market News Office. These offices are located in New York City, Boston and Gloucester, Mass., Hampton, Va., New Orleans, La., San Pedro, Calif., Seattle, Wash., and Chicago, Ill. In Alaska applications may be obtained from the Service's Fishery Products Laboratory in Ketchikan and the Service's office in Juneau; in Hawaii from the Service's Laboratory, 2570 Dole Street, Honolulu.

Forms are also available from the central office of the Fish and Wildlife Service at Washington 25, D. C. Completed application forms may be sent to the Washington office of the Service or to the field offices from which application forms were obtained.

Street addresses of the Fishery Market News Offices are as follows:

Boston, Mass., Rm. 10 Commonwealth Pier

New York, N. Y., 155 John Street Hampton, Va., 18 S. King Street New Orleans, La., Federal Building San Pedro, Calif., Post Office Building

Seattle, Wash., 421 Bell Street Terminal

Chicago, Ill., Rm 618, 565 W. Washington Street

Gloucester, Mass., Post Office Building

The broad objective of the fisheries loan fund created by the Act is to provide financial assistance which will aid the commercial fishing industry to bring about a general upgrading of the condition of both fishing vessels and fishing gear in order to produce more efficient and profitable fishing operations.

TITLE 50-WILDLIFE

Chapter I-Fish and Wildlife Service, Department of the Interior

Subchapter J-Fisheries Loan Fund PART 160-LOAN PROCEDURES

Basis and purpose. Section 4 of the Fish and Wildlife Act of 1956 (70 Stat. 1119, 1121), created a Fisheries Loan Fund to be used by the Secretary of the Interior under rules and regulations and under terms and conditions to be prescribed by him to make loans for financing and refinancing of operations, maintenance, replacement, repair, and equipment of fishing gear and vessels, and for research into the basic problems of fisheries. To implement the authorization thus granted, the following regulations, constituting a new subchapter and part, are adopted.

Sec

160.1 Definitions of terms

160.2 Purposes of loan funda

160.3 Interpretation of loan authorization. 160.4 Qualified loan applicants.

160.5 Basic limitations.

160.6

Applications.

Processing of loan applications.

Approval of loans. 160.7

160.8 160.9 Interest.

160.10 Maturity,

Security. 160.12 Penalties on default.

AUTHORITY: §§ 160.1 to 160.12 issued under sec. 4. 70 Stat. 1121.

§ 160.1 Definitions of terms. For the purposes of this part, the following terms shall be construed, respectively, to mean and to include:

(a) Secretary. The Secretary of the Interior or his authorized representative. (b) Administrator. Administrator of the Small Business Administration or his authorized representative.

(c) Person. Individual, association, partnership or corporation, any one or all, as the context requires.

(d) State. Any State, the Territories and possessions of the United States, the Commonwealth of Puerto Rico, and the District of Columbia.

§ 160.2 Purposes of loan fund. (a) Under section 4 of the Fish and Wildlife Act of 1956, the Secretary is authorized, among other things.

(1) To make loans for financing and refinancing of operations, maintenance, replacement, repair, and equipment of fishing gear and vessels, and for research into the basic problems of fisheries.

(2) Subject to the specific limitations in the section, to consent to the modification, with respect to the rate of interest, time of payment of any installment of principal, or security, of any loan contract to which he is a party.

The broad objective of the fisheries loan fund created by the Act is to provide financial assistance which will aid the commercial fishing industry to bring about a general upgrading of the condition of both fishing vessels and fishing gear thereby contributing to more efficient and profitable fishing operations.

(b) All financial assistance granted by the Secretary must be for one or more of the purposes set forth in paragraph (a) of this section.

§ 160.3 Interpretation of loan au thorization. The terms used in the Act to describe the purposes for which loans may be granted are construed to be limited to the meanings ascribed in this section.

(a) Operation of fishing gear and vessels. The words "operation of fishing gear and vessels" mean and include all phases of activity directly associated with the capture or landing of fish.

(b) Maintenance of fishing gear and vessels. The words "maintenance of fishing gear and vessels" mean the normal and routine upkeep of all parts of fishing gear and fishing vessels, including machinery and equipment.

(c) Replacement of fishing gear and vessels. The words "replacement of fishing gear and vessels" contemplate the purchase of fishing gear or fishing vessels or any equipment, parts, machinery, or other items incident to outfitting for fishing to replace lost, damaged, worn, obsolete, inefficient, or discarded items of a similar nature.

(d) Repair of fishing gear and vessels. The words "repair of fishing gear and vessels" mean the restoration of any worn or damaged part of fishing gear or fishing vessels to an efficient operating condition.

(e) Equipment of fishing gear and vessels. The words "equipment of fishing gear and vessels" mean the parts, machinery, or other items incident to outfitting for fishing which are purchased for use in fishing operations.

(f) Research into the basic problems The words "research into of fisheries. the basic problems of fisheries" mean investigation or experimentation designed to lead to fundamental improvements in the capture or landing of fish conducted as an integral part of vessel or gear oper-

§ 160.4 Qualified loan applicants. (a) Any person residing or conducting business in any State shall be deemed to be a qualified applicant for financial assistance if-

(1) He owns a commercial fishing vessel of United States registry (if registration is required) used directly in the conduct of fishing operations, irrespective of the type, size, power, or other characteristics of such vessel;

(2) He owns any type of commercial fishing gear used directly in the capture of fish:

(3) He is directly engaged in commercial fishing operations using a fishing vessel of United States registry (if registration is required) or fishing gear under his control on a lease or share basis; or

(4) He owns or controls any property, equipment, or facilities useful in conducting research into the basic problems of fisheries or possesses scientific, technological, or other skills useful in conducting such research.

(b) Applications for financial assistance cannot be considered if the loan is to be used for-

(1) Any phase of a shore operation.

(2) Refinancing an existing loan made upon reasonable terms. (3) Paying creditors for debts previously incurred (except where loans deemed to be based upon unreasonable

terms are refinanced). (4) Purchasing a partial interest in other fishing vessels or fishing gear or buying a partner's interest.

(5) Financing new business ventures involving fishing operations.

§ 160.5 Basic limitations, Applications for financial assistance may be considered only when there is evidence that the credit applied for is not otherwise available on reasonable terms. The financial assistance applied for shall be deemed to be otherwise available on reasonable terms, unless it is satisfactorily demonstrated that-

(a) Proof of refusal of the desired credit has been obtained from the applicant's bank of account: Provided, That if the amount of the loan applied for is in excess of the legal lending limit of the applicant's bank or in excess of the amount that the bank normally lends to any one borrower, then proof of refusal should be obtained from a correspondent bank or from any other lending institution whose lending capacity is adequate to cover the loan applied for. Proof of refusal of the credit applied for must contain the date, amount, and terms requested. Bank refusals to advance credit will not be considered the full test of unavailability of credit and, where there is knowledge or reason to believe that credit is otherwise available on reasonable terms from sources other than such banks, the credit applied for cannot be granted notwithstanding the receipt of written refusals from such banks.

(b) Other applicable Government flnancing is not available to the applicant.

§ 160.6 Application. Any person desiring financial assistance from the fisheries loan fund shall make application to the Fish and Wildlife Service. Department of the Interior, Washington 25, D. C., on a loan application form furnished by that Service except that, in the discretion of the Secretary, an application made other than by use of the prescribed form may be considered if the application contains information deemed to be sufficient. Such application shall indicate the purposes for which the loan is to be used, the period of the loan, and the security to be offered.

§ 160.7 Processing of loan applications. If it is determined, on the basis of a preliminary review, that the application is complete and appears to be in conformity with established rules and procedures. a field examination shall be made. Following completion of the field investigation the application will be forwarded with an appropriate report to the Fish and Wildlife Service. Department of the Interior, Washington 25, D. C.

§ 160.8 Approval of loans. agreements shall be executed on a form approved by the Secretary. The Secretary will evidence his approval of the loan by issuing a commitment order covering the terms and conditions for making the loan. Such commitment order shall be referred to the Administrator who will direct the closing of the loan with the applicant in the field and render services involving the collection of repayments and such other loan servicing functions as may be required, Any modification of the terms of a loan agreement following its execution must be agreed to in writing by the borrower and the Secretary.

§ 160.9 Interest. The rate of interest on all loans which may be granted is fixed at five per cent per annum.

§ 160.10 Maturity. The period of maturity of any loan which may be granted shall be determined and fixed according to the circumstances but in no event shall the date of maturity so fixed exceed a period of ten years.

§ 160.11 Security. Loans shall be approved only upon the furnishing of such security or other reasonable assurance of repayment as the Secretary may require.

§ 160.12 Penalties on default. Unless otherwise provided in the loan agreement, failure on the part of a borrower to conform to the terms of the loan agreement will be deemed grounds upon which the Secretary may cause any one rall of the following steps to be taken:

(a) Discontinue any further advances of funds contemplated by the loan agreement.

(b) Take possession of any or all collateral given as security and the property purchased with borrowed funds.

(c) Prosecute legal action against the borrower.

(d) Declare the entire amount advanced immediately due and payable.

(e) Prevent further disbursement of and withdraw any funds advanced to the borrower and remaining under his control.

These regulations shall become effective upon publication in the Federal Register.

Issued at Washington, D. C., and dated October 15, 1956.

* * * * *

FRED A. SEATON, Secretary of the Interior.

INTERIOR AND SMALL BUSINESS ADMINISTRATION COOPERATE IN GRANTING FISHERY LOANS:

Secretary of the Interior Fred A. Seaton and Administrator of the Small Business Administration Wendell B. Barnes, announced October 25, 1956, that the two agencies have concluded an agreement for administration of the recently-established \$10 million fisheries loan fund.

This loan fund was authorized by the Fish and Wildlife Act of 1956 and the regulations establishing the required administrative procedures were published in the <u>Federal Register</u> on October 18.

Under the terms of the "memorandum of understanding" signed by the two agencies, all completed loan applications must first be sent by the applicant to the Fish and Wildlife Service of the Department of the Interior, either to the nearest designated fishery field office or to the central office in Washington, D. C.

Applications approved for further processing will be forwarded by the Department to the Small Business Administration, which will initiate a field investigation to ascertain the applicant's financial standing. At the same time, the Service will determine the applicant's qualifications in the field of fisheries.

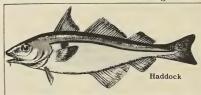
Loan applications approved by the Department of the Interior on the basis of investigations by the Small Business Administration and the Fish and Wildlife Service will be transmitted to the Small Business Administration, which will perform the services involving the issuance of the check for the loan, collection of repayments, and other loan servicing functions.

* * * *

REVISED REGULATIONS ADOPTED FOR

NEW ENGLAND HADDOCK FISHERY:
Revised regulations prescribing restrictions on trawling nets used in the
taking of haddock in the Northwest Atlantic Ocean by persons under the jurisdiction of the United States have been
adopted, the Department of the Interior
announced on September 19, 1956.

The new regulations, effective October 26, 1956, authorize the U. S. Fish and Wildlife Service to issue registra-



tion certificates for vessels to be used in the taking of haddock within Subarea 5 of the Northwest Atlantic Ocean. These certificates will be issued by the Service's Regional Office in Boston, Mass.

Subarea 5 is an area of the high seas lying off the coast of New England and

is one of five separately described areas of the high seas covered by the International Convention for the Northwest Atlantic Fisheries, signed at Washington, February 8, 1949.

Vessels registered for use in the haddock fishery will be required to use trawl nets having a minimum mesh size of $4\frac{1}{2}$ inches. As a result, possession of trawl nets with a mesh size less than $4\frac{1}{2}$ inches on vessels which must be so registered to participate in haddock fishing will be illegal, thus making more effective the enforcement of the restriction on mesh size. Prior to the new regulation, no registration to so identify boats engaged in haddock fishing was required.

The minimum mesh size restriction has been in effect since 1953. It was adopted in that year following a proposal by the 10-nation International Commission for the Northwest Atlantic Fisheries. Experience gained during three years of operations has indicated the desirability of effecting the change which will be helpful in obtaining industrywide compliance with the requirements of the regulations.

For many years, prior to the adoption of the regulations, haddock fishermen using nets having an inside measurement as small as 2 inches caught haddock which were too small to be marketed. These small haddock were discarded at sea. The present regulations, based upon knowledge obtained through extensive research into the rates of growth and mortality of haddock, specifies a minimum mesh size of 4½-inches inside measure which has the effect of permitting immature haddock to escape unharmed from the nets. Since adoption of the new fishing practices in 1953, biologists of the Fish and Wildlife Service estimate that several million pounds of young fish have been left in the sea each year for capture at a future time when they will have grown to a more desirable

By notice of proposed rule making published in the Federal Register on June 12, 1956, the public was invited to participate in the adoption of the proposed amendments to these regulations by submitting data, views, or arguments to the Director of the Fish and Wildlife Service within 30 days from the publication of the notice. Only one person sent in comments.

The revised regulations as published in the Federal Register of September 25, 1956, follow:

TITLE 50-WILDLIFE

Chapter I-Fish and Wildlife Service. Department of the Interior

Fisheries

Subchapter I-Northwest Atlantic Commercial PART 155-HADDOCK PROVISIONS

Experience gained since the initial adoption of regulations effective May 31, 1953 (18 F. R. 2414), prescribing restrictions on trawling nets used in the taking of haddock in the Northwest Atlantic Ocean, has demonstrated a need for further revisions in the regulations to make the same more effective.

In accordance with section 4 (a) of the Northwest Atlantic Fisheries Act of 1950, proposed amendments to the regulations were submitted to the Advisory Committee to the United States Commissioners on the International Commission of the Northwest Atlantic Fisheries on March 26, 1956, at which time the proposed revised regulations received the approval, in principle, of the Advisory Committee.

By notice of proposed rule making published on June 12, 1956 (21 F. R. 4015) the public was invited to par-ticipate in the adoption of proposed amendments to these regulations by submitting data, views, or arguments to the Director, Fish and Wildlife Service, Washington 25, D. C., within a period of thirty days from the publication of the notice. Consideration having been given to all pertinent data received in response to the notice, the regulations appearing below are adopted to replace Part 155— Haddock Provisions:

155.1 Meaning of terms.
155.2 Haddock registration certificates.

155.3 Restrictions on fishing gear. 155.4 Temporary suspension of haddock

registration certificates. 155.5 Certain persons and vessels exempted. AUTHORITY: § 155.1 to 155.5 issued under sec. 7, 64 Stat. 1067; 16 U. S. C. 986.

§ 155.1 Meaning of terms. When used in the regulations in this part, unless the context otherwise requires, terms shall have the meanings ascribed hereinafter in this section.

(a) Regulatory area. The words "regulatory area" mean that portion of the Convention area, including all waters except territorial waters, bounded by a line beginning at the terminus of the international boundary between the Grand Manan Channel at a point in 44°46'35.34" north latitude, 66°54'11.23" west longitude; thence due south to the parallel of 43°50' north latitude; thence due west to the Meridian of 67°40' west longitude; thence due south to the parallel of 42°20' north latitude; thence due east to a point in 66° west longitude; thence along a rhumb line in a southeasterly direction to a point in 42° north latitude 65°40' west longitude; thence due south to the parallel of 39° north latitude; thence due west to the Meridian of 71°40' west longitude; thence due north to a point three miles off the coast of the State of Rhode Island; thence along the coasts of Rhode Island, Massachusetts, New Hampshire, and Maine at a distance of three miles to the point of beginning

(b) Haddock. The word "haddock" denotes any fish of the species Melanogrammus aeglefinus

(c) Haddock fishing. The words 'haddock fishing' mean and include (1) The words the catching, taking or fishing for or the attempted catching, taking or fishing for fish of the species Melanogrammus aegle-United States of America and Canada in finus; and (2) the outfitting and departure of a vessel for or the return of a vessel from haddock fishing.

(d) Fishing vessel. The words "fishing vessel" denote every kind, type or description of watercraft or vessel subject to the jurisdiction of the United States used in or outfitted for catching or processing fish or transporting fish from fishing grounds.

(e) Trawl net. The words "trawl net" means any large bag net dragged in the sea by a vessel or vessels for the

purpose of taking fish.

(f) Cod end. The words "cod end" mean the bag-like extension attached to the after end of the belly of the trawl net and used to retain the catch.

§ 155.2 Haddock registration certificates. (a) After the filteenth day following the effective date of this part, no person shall engage in haddock fishing within the regulatory area nor shall any person possess, transport or deliver by means of any fishing vessel haddock taken within such area except under a haddock registration certificate issued and in force in conformity with the regu-

lations in this part.

- (b) The owner or operator of a fishing vessel may obtain without charge a haddock registration certificate by furnishing, on a form to be supplied by the Fish and Wildlife Service, information specifying the names and addresses of the owner and operator of the vessel, the name, official number and home port of the vessel, and the period for which the haddock registration certificate is desired. The form shall be submitted, in duplicate, to the Regional Director, Fish and Wildlife Service, Department of the Interior, Boston, Massachusetts, who shall grant the registration certificate for the duration specified by the applicant in the form but in no event to extend beyond the end of the calendar year during which the registration certificate is issued. New registration certificates shall similarly be issued to replace expired, lost or mutilated certificates. An application for replacement of an expiring registration certificate shall be made in like manner as the original application not later than ten days prior to the expiration date of the expiring certifi-
- (c) The haddock registration certificate so issued by the Fish and Wildlife Service shall be carried on board the vessel for which it is issued at all times and such certificate, the vessel, its gear and equipment shall at all times be subject to inspection by officers authorized to enforce the regulations in this part.
- § 155.3 Restrictions on fishing gear.

 (a) No person shall possess at any time on board a vessel for which a haddock registration certificate is in force, or use or attempt to use from such vessel, a trawl net or nets, parts of nets or netting

having a mesh size of less than four and one-half inches as defined in this section.

(b) As used in this section, the term mesh size of less than four and one-half inches" shall mean (1) with respect to any part of the net except the cod end, the average size of any twenty consecutive meshes in any row located at least ten meshes from the side lacings measured when wet after use; and (2) with respect to the cod end, the average size of any row of meshes running the length of the cod end located at least ten meshes from the side lacings, measured when wet after use, or, at the option of the user, a cod end which has been approved, in accordance with paragraph (d) of this section, by an authorized employee of the Fish and Wildlife Service, as having a mesh size when ary before use equivalent to not less than four and one-half inches when wet after use

(c) All measurements of meshes when wet after use shall be made by the insertion into such meshes under pressure of not less than ten nor more than fifteen pounds of a flat wedge-shaped gauge having a taper of two inches in nine inches and a thickness of three

thirty-seconds of an inch

(d) For the purpose of approving dry cod ends before use, as contemplated by paragraph (b) of this section, the average mesh size of such cod ends shall be determined by measuring the length of any single row of meshes running the length of the cod end, parallel to the long axis of the cod end and located at least ten meshes from the side lacings, when stretched under a tension of two hundred pounds, and dividing the length by the number of meshes in such row: Provided, That not more than ten percent of the meshes in such row shall be more than one-half inch smaller when measured between knot centers than the average of the row. Cod ends so meas ured which are constructed of the twines and are of not less than the average mesh sizes specified in the table below may be approved for haddock fishing by any authorized employee of the Fish and Wildlife Service by the attachment to such cod end of an appropriate seal.

Twine Average mesh size
4-ply 45-yard manila, 5.625 inches (5%'').

double strand.
4-ply 50-yard manila, 5.625 inches (5%").
double strand.
4-ply 75-yard manila, 5.625 inches (5%").

double strand.
4-ply 80-yard manila, 5.500 inches (5½").
double strand.

double strand.
120-thread cotton.
4.250 inches (41/4").

(e) The alteration, defacement or reuse of any seal affixed to a cod end in accordance with this section is prohibited.

(f) The repair, alteration or other modification of a cod end to which a seal has been affixed in accordance with this section shall invalidate such seal and such cod end shall not thereafter be

deemed to be approved for haddock fishing. Nothing contained in this paragraph shall preclude the continued use
at the option of the user. of a cod end
having an invalidated seal affixed thereto: Provided, That such cod end after
repair, alteration or other modification
shall continue to have a mesh size of not
less than four and one-half inches as
defined in paragraph (b) of this section.

(g) The use in haddock fishing within the regulatory area of any device or method which will obstruct the meshes of the trawl net or which otherwise will have the effect of diminishing the size of said meshes is prohibited: Provided, That a protective covering may be attached to the puderside only of the codend alone of the net to reduce and prevent damage thereto.

§ 155.4 Temporary suspension of haddock registration certificates. (a) The owner or operator of any fishing vessel which is proposed to be used in haddock fishing beyond the limits of the regulatory area or is proposed to be used in fishing within such area for species of fish other than haddock, may obtain a temporary suspension of the haddock registration certificate issued for such vessel for the specified period during which such nonregulated fishing is to be conducted.

conducted.

(b) Temporary suspension of haddock registration certificates shall be granted upon oral or written request, specifying the period of suspension desired, by an authorized officer of one of the following agencies: Fish and Wildlife Service, Coast Guard, Bureau of Customs, and Post Office Department, and by an authorized officer of the States of Maine and Massachusetts. Such officer shall make appropriate endorsement on the certificate evidencing the duration of its suspension.

§ 155.5 Certain persons and vessels exempted. Nothing contained in the regulations in this part shall apply to:

(a) Any person who or vessel which, in the course of taking fish other than haddock, takes and possesses a quantity of haddock not exceeding five thousand pounds, or ten percent of all fish on the vessel from which the fishing is con-

ducted, whichever is the greater.

(b) Any person or vessel authorized by the Director of the Fish and Wildlife Service to engage in haddock fishing for

scientific purposes.

(c) Any vessel documented as a common carrier by the Government of the United States and engaged exclusively in the carriage of freight and passengers.

These regulations shall become effective 30 days after publication in the FEDERAL REGISTER.

Dated: September 18, 1956.

FRED G. AANDAHL, Acting Secretary of the Interior.



Tariff Commission

"ESCAPE CLAUSE" REPORT ON GROUNDFISH FILLETS RELEASED:

The Tariff Commission on October 12 submitted a report to the President on its findings and recommendation in the "escape clause" investigation No. 47 made under section 7 of the Trade Agreements Extension Act of 1951, as amended, with respect to groundfish fillets. Such fillets (include frozen fillet blocks or slabs used for making fish steaks) are subject to duty at rates imposed under paragraph 717(b) of the Tariff Act of 1930, as modified pursuant to a tariff concession granted in the General Agreement on Tariffs and Trade on January 1, 1948. Under that agreement, the duty is 1-7/8 cents per pound on an annual quota equal to whichever of the two following amounts is the larger: (1) 15 million pounds, or (2) 15 percent of the average annual United States consumption of such fish fillets in the three preceding calendar years. Imports in excess of that quota are dutiable at 2-1/2 cents a pound, which is the rate of duty originally provided for all imports of groundfish fillets in paragraph 717(b) of the Tariff Act of 1930. Paragraph 717(b) covers "cod, haddock, hake, pollock, cusk, and rosefish, fresh or frozen (whether or not packed in ice), all the foregoing, filleted, skinned, boned, sliced, or divided into portions.

The Commission unanimously found that, as a result in part of the customs treatment reflecting the aforementioned concession, groundfish fillets are being imported into the United States in such increased quantities, both actual and relative, as to cause serious injury to the domestic industry producing like or directly competitive products. The Commission also found that in order to remedy this serious injury, it is necessary that the duty on the imports that enter under the tariff quota be increased from 1-7/8 cents a pound to 2, 8125 cents a pound, and that the duty on the imports that enter in excess of that quota be increased from 2-1/2 cents a pound to 3.75 cents a pound.

The Commission's report contains a brief summary of the information assembled in the investigation and also a statistical appendix.

The conclusions arrived at by the Commission were:

"...the domestic industry producing groundfish fillets has been in serious difficulty during the past several years. Its distress stems from a number of causes, but for the purposes of this investigation the Commission needs to consider only whether increased imports, either actual or relative to domes tic production, "have contributed substantially towards causing or threatening serious injury to such industry."...

"The statistics... indicate
"(1) that imports of groundfish fillets have increased almost continuously from 9 million pounds in 1939 to 88 million pounds in 1951, and to 128 million pounds in 1955;

"(2) that the increase in imports has occurred in all major types and forms of groundfish fillets;
"(3) that United States production of groundfish fillets rose from 100 million pounds in 1939 to 149

million pounds in 1951, and thereafter declined ir-regularly to 106 million pounds in 1955; "(4) that cold-storage holdings of frozen groundfish fillets in recent years have recurrently been at such high levels as to have a depressing effect on

such high levels as to nave a depressing effect of the prices of groundfish fillets; "(5) that United States consumption of groundfish fillets rose from 106 million pounds in 1939 to 244 million pounds (inclusive of 53 million pounds of frozen slabs) in 1955; "(6) that the share of the domestic market sup-

plied by the domestic producers of groundfish fil-lets declined from 95 percent in 1939 to 62 percent in 1951, to 51 percent in 1954, and to 43 percent in

1955;
"(7) that average prices received by processors
for groundfish fillets have declined sharply but irput in 1955 was 29 percent less than in 1951 and

only 5 percent above that in 1939);
"(8) that employment in domestic filleting plants has followed the same general trend as the volume of domestic output of groundfish fillets;

"(9) that wage rates in filleting plants have increased during the past several years but not as rapidly as those in other manufacturing industries in the Boston area;

"(10) that, on the basis of sampling, the domestic concerns that fillet groundfish, in the aggregate, have sustained operating losses in all recent years;

"(11) that about 95 percent of the United States catch of groundfish is landed by New England's groundfish-fishing fleet, which consists almost wholly of large and medium trawlers;

"(12) that currently more than 80 percent of the landings of groundfish in New England ports are used by primary processors there for conversion into fillets and slabs, and that in most of those ports the only important buyers of groundfish are the fil-

letting plants;
"(13) that ex-vessel prices for groundfish rose considerably between 1939 and the period 1951-52, and have declined irregularly but substantially

'(14) that largely because of the impact of severe competition from imported groundfish fillets, the size of the New England groundfish-fishing fleet has declined;
"(15) that the total number of job opportunities

for groundfish fishermen in New England increased between 1944 and 1947, but since then has declined substantially--largely because of the reduction in

the size of the fleet;
"(16) that average dollar earnings of fishermen engaged in groundfish fishing declined sharply be-tween 1951 (when earnings were at their highest in recent years) and 1953, but rose in the following 2

years to a level only slightly higher than that which

prevailed in 1953;

"(17) that average dollar earnings of fishermen in recent years have not advanced as rapidly as those of factory workers in the Boston area, and that the purchasing power of groundfish fishermen's incomes declined by an average of 23 percent between 1950 and 1955; and

"(18) that, on the basis of sampling, the owners of the domestic groundfish-fishing fleet, in the aggregate, have been operating at a loss in all recent

years.

"On the basis of the facts outlined above, the Commission finds that increased imports of groundfish fillets have contributed substantially towards causing serious injury to the domestic industry producing groundfish fillets. Further, the Commission is of the opinion that as long as this industry continues to be confronted with competition from imported groundfish fillets as severe as has prevailed during the past several years, it has little prospect of extricating itself from the complex of problems that confront it. Under existing conditions of competition from imports, vessel owners have little or no incentive even to replace old or lost vessels with new ones -- much less to make additions to their fleets. Indeed, some owners have already sold their vessels, and others have transferred vessels to fish- domestic groundfish-fishing and filleting industry."

ing ventures in other waters and even under other flags. Continued shrinkage in the size of the fleet lessens job opportunities for fishermen, reduces the size of their annual catch of fish, and lowers the scale of filleting operations which in turn results in lessened employment, reduced earnings, and lower profits in filleting plants. The impact of such a chain of events is particularly disturbing to the major New England port cities whose economies are so heavily dependent upon maintenance of a healthy industry for producing groundfish fillets.

"The Commission believes that the application of the increased rates of duty here recommended will prevent the serious injury now being experienced by the domestic industry because of the severity of competition from imported groundfish fillets, and that these increases in duty, together with the benefits that the industry may expect from recently enacted legislation (Public Laws 1024 and 1027, 84th Congress) should enable it to deal effectively with its over-all problems.

"The Commission believes that the rates of duty that it here recommends (in accordance with the requirements of section 7 of the Trade Agreements Extension Act of 1951, as amended), are the lowest that will afford relief from serious injury to the



PEARL ESSENCE

Pearl essence is made by several different processes which involve the removal of the guanin crystals from the scales of fish. These crystals are deposited in the epidermis of the scales and give them their luster. After processing this luster is imparted to beads of glass or other objects in the manufacture of artificial pearls.

The herring, Clupea harengus, caught along the North Atlantic coast has provided much of the raw material for this trade. Recently pearl essence has been produced from herring scales from the Pacific British Columbia herring fishery. One hundred tons of fish are reported to produce one ton of scales, which produces one pound of essence.

> -- "Sea Secrets," The Marine Laboratory, University of Miami, Coral Gables, Fla.

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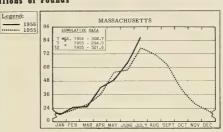
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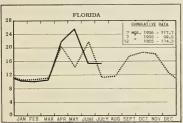
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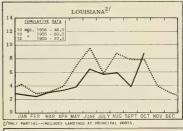


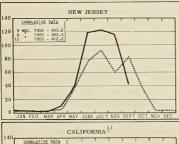
CHART I - FISHERY LANDINGS for SELECTED STATES In Millions of Pounds

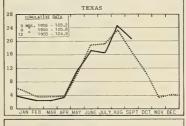












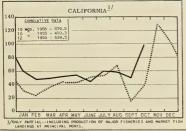
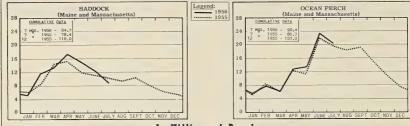


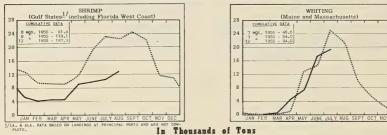


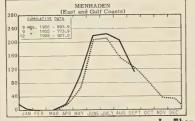
CHART 2 - LANDINGS for SELECTED FISHERIES

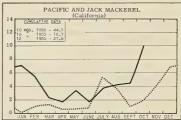
In Millions of Pounds



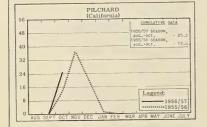
In Millions of Pounds







In Thousands of Tons



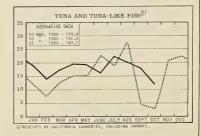
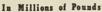
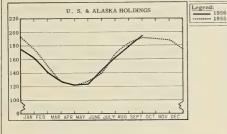
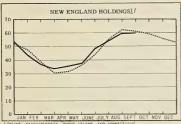


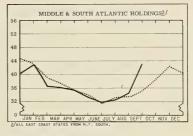
CHART 3 - COLD-STORAGE HOLDINGS and FREEZINGS of FISHERY PRODUCTS ★

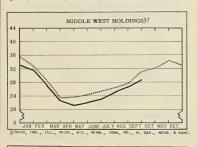


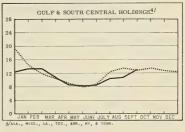


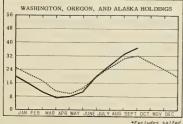








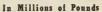






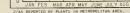
*Excludes saited, cured, and smoked products

CHART 4 - RECEIPTS and COLD-STORAGE HOLDINGS of FISHERY PRODUCTS at PRINCIPAL DISTRIBUTION CENTERS

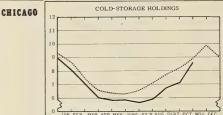




COLD-STORAGE HOLDINGS 2/ NEW YORK CITY 18







SEATTLE WHOLESALE MARKET RECEIPTS, LANDINGS, & IMPORTS (FRESH & FROZEN) 28 CUMULATIVE DATA 20 16 12 Legend:

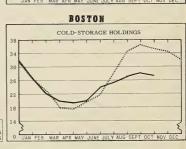


CHART 5 - FISH MEAL and OIL PRODUCTION - U.S and ALASKA



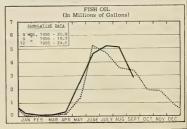
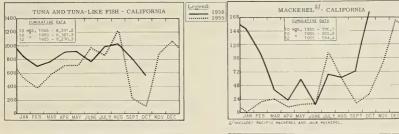
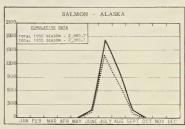


CHART 6 - CANNED PACKS of SELECTED FISHERY PRODUCTS

In Thousands of Standard Cases

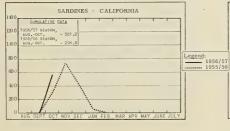






1400	CUMULATIVE DATA
1200	12 Mgs, 1956 - 2,200.0
000	
800	
600	_
400	
200	
0	
OL	JAN FEB MAR APR MAY JUNE JULY AUG SEPT OCT NOV DEC

Variety	No. Cans	$\underline{Can} \ \underline{Designation}$	Net 1	Vg1
SARDINES	100	1/4 drawn	31/4	02
SHRIMP	48		5	02
TUNA	48	No. ½ tuna	6 & 7	oz
PILCHARDS	48	No. 1 oval	15	02
SALMON	48	1-pound tall	16	oz
ANCHOVIES	48	1 lb.	8	oz



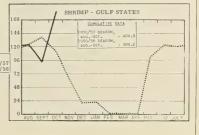
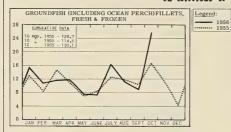
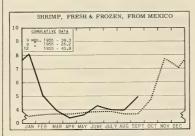


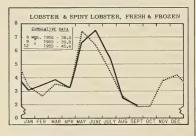
CHART 7 - U.S. FISHERY PRODUCTS IMPORTS

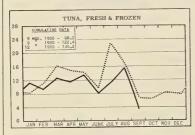
In Millions of Pounds



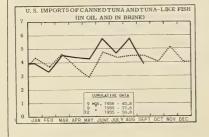


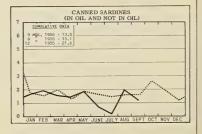


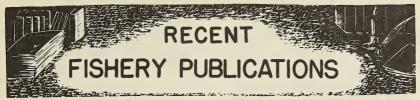












FISH AND WILDLIFE SERVICE PUBLICATIONS

THESE PROCESSED PUBLICATIONS ARE AVAILABLE FREE FROM THE DIVISION OF INFORMATION, U. S. FISH AND WILDLIFE SERV-ICE, WASHINGTON 25, D. C. TYPES OF PUBLICATIONS ARE DESIG-NATED AS FOLLOWS:

CFS - CURRENT FISHERY STATISTICS OF THE UNITED STATES

AND ALASKA. - FISHERY LEAFLETS.

FI - FISHERY LEAFLEIS.

STATISTICAL SECTION LISTS OF DEALERS IN AND PRODUCES OF FISHERY PRODUCTS AND SYPRODUCTS.

SSR. FISH - SPECIAL SCIENTIFIC REPORTS--FISHERIES (LIMITED DISTRIBUTION).

SEP. SEPRARIES (REPRINS) FROM COMMERCIAL FISHERIES

REVIEW.

Title CFS-1357 - Manufactured Fishery Products, 1954

Annual Summary, 7 pp. CFS-1389 - Frozen Fish Report, July 1956, 8 pp. CFS-1390 - Massachusetts Landings, April 1956,

5 pp CFS-1397 - Fish Meal and Oil, July 1956, 2 pp. CFS-1398 - Ohio Landings, July 1956, 3 pp.

CFS-1399 - Texas Landings, July 1956, 3 pp. CFS-1400 - Florida Landings, May 1956, 6 pp

CFS-1401 - North Carolina Landings, July 1956, 2 pp.

CFS-1402 - Georgia Landings, July 1956, 2 pp. CFS-1403 - Frozen Fish Report, August 1956, 8 pp.

CFS-1404 - Alabama Landings, June 1956, 4 pp. CFS-1405 - California Landings, May 1956, 4 pp. CFS-1406 - Mississippi Landings, June 1956, 2 pp.

CFS-1407 - Florida Landings, June 1956, 6 pp. CFS-1408 - Maine Landings, July 1956, 3 pp.

CFS-1409 - New York Landings, July 1956, 4 pp. CFS-1410 - Mass. Landings, May 1956, 5 pp.

CFS-1411 - Shrimp Landings, July 1956, 4 pp. CFS-1412 - Fish Meal and Oil, August 1956, 2 pp. CFS-1414 - Ohio Landings, August 1956, 2 pp.

CFS-1415 - Alabama Landings, July 1956, 3 pp. CFS-1417 - New Jersey Landings, July 1956, 4 pp.

CFS-1418 - Georgia Landings, August 1956, 2 pp. CFS-1419 - California Landings, June 1956, 4 pp.

CFS-1420 - Texas Landings, August 1956, 3 pp. CFS-1423 - Maine Landings, August 1956, 3 pp. CFS-1424 - New Jersey Landings, August 1956, 4 pp.

Wholesale Dealers in Fishery Products (Revised): SL-27 - Indiana (Lake Michigan Area), 1956, 1 p.

SL-30 - Pennsylvania (Lake Erie), 1956, 1 p. SL-31 - New York (Lakes Area), 1956, 2 pp. SL-37 - Kansas (Missouri River Area), 1956, 1 p.

SL-38 - Missouri (Mississippi River and Tributar ies Area), 1956, 2 pp.

SL-42 - Kentucky, 1956, 1 p. SL-44 - Nebraska (Missouri River Area), 1956, 1 p.

FL - 232 - Fishery Technology Abstract Card System, by M. E. Stansby, K. L. Osterhaug, and F. Bruce Sanford, 39 pp., processed, revised July 1956. Since 1943 the Service has maintained a comprehensive card file of abstracts from articles appearing in current literature pertaining to fishery technology. Sources of information being abstracted consist of about 70 periodicals dealing with fishery, food, general scientific, and technical subjects, and include Chemical Abstracts from January 1943 to the present. In addition to the material accumulated during this period, a miscellaneous group of abstract cards covering a portion of this field, from 1930 to 1943, is included. About 19,000 cards are on file at present. Since January 1948, the abstracts have been published in the monthly periodical Commercial Fisheries Abstracts. This leaflet describes the system used for classifying these cards according to the subject matter. It is similar to the Dewey Decimal system in principal, but the entire range of values 0-9 was adapted to fishery technology and related subjects.

SSR-Fish, No. 176 - English Translations of Fishery Literature, Further Listings, compiled by Leslie W. Scattergood, 33 pp., processed, July 1956. This report is a continuation of a series which was initiated to provide fishery investigators with information on the amount and availability of English translations of fishery litera-The first two sections of this series were issued by the Washington Department of Fisheries, Smith Tower Bldg., Seattle 4, Wash. The third and fourth reports were published by the Service as "Special Scientific Report -- Fisheries Nos. 35 and 72."

SSR-Fish. No. 177 - Zooplankton Volumes off the Pacific Coast, 1955, 35 pp., processed, August

SSR-Fish. No. 180 - Mid-Pacific Oceanography, Part VIII, Middle Latitude Waters, January March 1954, by James W. McGary and E. D. Stroup, 178 pp., processed, June 1956.

This is Cortland (Fish-Cultural Station, Experimental Hatchery, Trout-Nutrition Laboratory, In-Service Training School), Circular 42, 2 pp., folder, illus., printed.

Glossary of Marine Conservation Terms in English and Russian, compiled by Paul S. Galtsoff, Circular 43, 130 pp., processed, June 1956. This glossary was prepared primarily to facilitate the work of interpreters and translators assigned to international conferences dealing with the

problems of utilization and conservation of living resources of the sea. It is not a dictionary in the ordinary sense of the word, for it comprises primarily the terms and expressions which have special meaning to conservationists, biologists, statisticians, and oceanographers. A few parliamentary and legal expressions which usually appear in international treaties are also included.

(Alaska) Commercial Fisheries Regulations Amendments, Amendments Nos. 1 to 18 to Regulatory Announcement No. 48, 8 pp., processed, 1956.

Sep. No. 450 - Georges Bank Haddock Fishery--Changes in Scrod Abundance in Recent Years. Sep. No. 451 - Bleeding and Heat Death in the Southern Oyster.

Sep. No. 452 - New Diving Sled, Sep. No. 453 - Research in Service Laboratories (October 1956): Contains these short articles --Experimental Fish Meal Dryer;" "Experimental Bulk Ocean Shipments of Alaska Herring Meal;" "Processing Studies on Menhaden Meal;" "Converting Fish Scales into Animal Food;"
"Salmon Waste as Bait;" "Breaded Shrimp Interim Federal Specification.

THE FOLLOWING SERVICE PUBLICATIONS ARE AVAILABLE ONLY FROM THE SPECIFIC OFFICE MENTIONED IN THE REVIEW.

<u>Production of Fishery Products in Selected Areas</u> of <u>Virginia</u>, <u>Maryland</u>, and <u>North Carolina</u> (As Reported to Hampton Fishery Market News Office), 1955, by William N. Kelly, 40 pp., processed, 1956. (Available free from the Market News Service, U. S. Fish and Wildlife Service, 18 South King St., Hampton, Va.) An analysis of the production of fish and shellfish in selected areas of Virginia, Maryland, and North Carolina during 1955 is presented in the first part of this report. The author discusses landings in the areas covered, production of the principal species: scup or porgy, croaker, sea bass, sea trout, fluke, spot, shad, crab meat, and shrimp. Information on the menhadenfishery is also presented -- includes receipts reported by Virginia and North Carolina fish meal and oil plants by months for 1955 and 1954. Statistical tables make up the second part of the report, showing production of fish and shellfish for each area by months, production by localities for 1955 and 1954, and shrimp landings in selected North Carolina ports by months. The areas covered in this report include: Atlantic, Beaufort, and Morehead City, N. C.; Norfolk, Portsmouth, Messick, Seaford, Yorktown, Gloucester Point, Newport News, Hampton, Lancaster County, Cape Charles, Oyster, Willis Wharf, and Wachapreague, Va.; Ocean City, Cambridge, and Crisfield, Md. In addition, shrimp landings are reported for Atlantic, Beaufort, Morehead City, Pamlico County, Englehard, and Southport, N. C.

Receipts of Fresh and Frozen Fishery Products at

New York City's Fulton Fish Market, 1955, by
T. J. Risoli, 18 pp., processed. (Available
free from the Market News Service, U. S. Fish
and Wildlife Service, 155 John St., New York 38, N. Y.) Contains an analysis of fishery products receipts for 1955 and marketing trends at New York City. The author discusses in the first part of this report the salt-water market

receipts; marketing trends; trends in method of transportation; receipts by shipping areas; selling prices of selected species; containers; methods for expanding markets; imports of fishery products through the New York customs district; fresh-water fish receipts; and nutritive value of fishery products. The tables, in the second part of this report, present data on receipts of fish and shellfish in the salt-water section of Fulton Market by months and method of transportation, by species and method of transportation, and by states and provinces of origin.

Boston Fishery Products Monthly Summary, July 1956, 15 pp.; Boston Fishery Products Monthly Summary, August 1956, 15 pp. (Market News Service, U. S. Fish and Wildlife Service, 10 Commonwealth Pier, Boston 10, Mass.) Landings and ex-vessel prices by species for fares landed at the Boston Fish Pier and sold through the New England Fish Exchange; and Boston frozen fishery products prices to primary wholesalers; for the months indicated.

California Fishery Products Monthly Summary, August 1956, 10 pp.; California Fishery Prod-ucts Monthly Summary, September 1956, 9 pp. (Market News Service, U. S. Fish and Wildlife Service, Post Office Bldg., San Pedro, Calif.) California cannery receipts of raw tuna and tunalike fish, herring, mackerel, anchovies and squid; pack of canned tuna, mackerel, herring, anchovies, and squid; market fish receipts at San Pedro, Santa Monica, San Diego, and Eureka areas; California imports; canned fish and frozen shrimp prices.

(Chicago) July 1956 Monthly Summary of Chicago's Fresh and Frozen Fishery Products Receipts and Wholesale Prices, 10 pp.; (Chicago) August 1956 Monthly Summary of Chicago's Fresh and Frozen Fishery Products Receipts and Whole-sale Prices, 10 pp. (Market News Service, U.S. Fish and Wildlife Service, 565 W. Washington St., Chicago 6, Ill.) Receipts at Chicago by species and by states and provinces; fresh-water fish, shrimp, and frozen fillet wholesale market prices; for the months indicated.

Gulf Monthly Landings, Production, and Shipments of Fishery Products, August 1956, 5 pp.; Gulf Monthly Landings, Production, and Shipments of Fishery Products, September 1956, 5 pp. (Market News Service, U. S. Fish and Wildlife Service, 609-611 Federal Bldg., New Orleans 12, La.) Gulf States shrimp, oyster, finfish, and blue crab landings; crab meat production; LCL express shipments from New Orleans; and wholesale prices of fish and shellfish on the New Orleans French Market; for the months indicated.

Monthly Summary of Fishery Products Production in Selected Areas of Virginia, North Carolina, and Maryland, August 1956, 4 pp.; Monthly Sum-mary of Fishery Products Production in Selected Areas of Virginia, North Carolina, and Maryland, September 1956, 4 pp. (Market News Service, U. S. Fish and Wildlife Service, 18 S. King St., Hampton, Va.). Fishery production for the Virginia areas of Hampton Roads, Lower North-ern Neck, and Eastern Shore; the Maryland areas of Crisfield, Cambridge, and Ocean City; and the North Carolina areas of Atlantic, Beaufort, and Morehead City; together with cumulative and comparative data; for the months indicated. (New York) Monthly Summary - July 1956 - Receipts of Fishery Products at the New York City Wholesale Salt-Water Market, 4pp; (New York) Monthly Summary - August 1956 - Receipts of Fishery Products at the New York City Wholesale Salt-Water Market, 4pp; (Market News Service, U. S., Fish and Wildlife Service, 155 John St., New York 38, N. Y.). Receipts in the salt-water section of the Fulton Fish Market by species and by states and provinces for the months indicated.

(Seattle) Monthly Summary - Fishery Products, July 1956, 5pp.; (Seattle) Monthly Summary - Fishery Products, August 1956, 6pp.; (Seattle) Monthly Summary - Fishery Products, September 1956, 6pp.; (Market News Service, U. S. Fish & Wildlife Service, 421 Bell St. Terminal, Seattle 1, Wash.). Includes landings and local receipts, with ex-vessel and wholesale prices in some instances, as reported by Seattle and Astoria (Oregon) wholesale dealers; also Northwest Pacific halibut landings.

THE FOLLOWING SERVICE PUBLICATIONS ARE FOR SALE AND ARE AVAILABLE ONLY FROM THE SUPERINTENDENT OF DOCUMENTS, WASHINGTON 25, D. C.

Alaska Fishery and Fur-Seal Industries, 1954, by Seton H. Thompson, Statistical Digest No. 37, 73 pp., illus., printed, 35 cents, 1956. Detailed reports and statistical tables concerning the operation and yield of the various fishery industries are presented, with added data on certain related matters, particularly the condition of the fishery resources. Under the section on fishery industries, the following subjects are covered: court decisions; Alaska Department of Fisheries; research; exploratory fishing investigations; administration; management; and general statistics on salmon, herring, halibut, shellfish, and miscellaneous fishery products. The second section on the Pribilof Islands furseal industry covers administration, fur-seal population studies, and general statistics on the fur seals taken in 1954. A statement is also included on sealing privileges accorded aborigines.

Biology of the Sea Lamprey in Its Parasitic Phase, by Phillip S. Parker and Robert E. Lennon, Research Report 44, 35 pp., illus., printed, 20 cents, 1956.

Biology of Young Lake Trout (SALVELINUS NAMA-YCUSH) in Lake Michigan, by John Van Oosten and Paul H. Eschmeyer, Research Report 42, 91 pp., illus., printed, 40 cents, 1956.

Effect of Pulse Frequency and Duration in Guiding Salmon Fingerlings by Electricity, by Howard L. Raymond, Research Report 43, 22 pp., illus., printed, 15 cents, 1956.

How to Cook Halibut, by Kathryn L. Osterhaug and Rose G. Kerr, Test Kitchen Series No. 9, 12 pp., illus., printed, 20 cents, 1956. A new fishery publication of interest to housewives, home economists, and food editors. Contains 25 choice recipes which have been developed and kitchentested by the Service's staff of home economists. The halibut, as the booklet explains, is the largest of the flatfishes and is found in the cold waters of the north Pacific, the Arctic, and the north

Atlantic Oceans. Its delicious white, translucent meat is known and appreciated by fish gourmets the country over.

Frozen steaks or fillets may be cooked without thawing if additional cooking time is allowed. When steaks or fillets are to be breaded or stuffed, they are more easily handled if they have been previously thawed. The preferred method for thawing frozen fish is to leave the fish in the refrigerator overnight. If room-temperature thawing is necessary, great care must be taken so that the fish remains chilled at all times. Halibut may be prepared by any of the basic cooking methods such as frying, baking, broiling, boiling, and steaming. Some of the easy-to-make yet out-of-the-ordinary recipes included are: halibut avocado cocktail, halibut and onion soup, curried halibut casserole, broiled halibut steaks with anchovy butter, halibut Hawaiian, halibut steaks with piquant meringue, and halibut in herb sauce. In addition to the recipes for cooking halibut, the authors describe briefly the halibut fishery

<u>Preparation of a Dry Product from Condensed Menhaden Solubles, by C. F. Lee, Research Report</u> 45, 35 pp., illus., printed, 20 cents, 1956. Deals with the methods of preparation and with factors determining the characteristics of a dried fishsolubles product. The first portion of the report deals with the preparation and study of the drying characteristics of different samples of menhaden solubles. A Suitability Factor, designed to rate on a comparative scale the drying behavior and properties of the various dried products, was developed but is not the sole criterion of the value of a specific sample. The second portion deals with the chemical analysis of the samples. The ammonia, dry solids, fat, ash, crude and corrected protein content as well as the pH, specific gravity, viscosity and thixotropy of the samples were determined. The effect of additives on the properties of the dried products was investigated. Results are summarized, and conclusions as to the present commercial feasibility of such a product are made.

Validity of Age Determination from Scales, and Growth of Marked Lake Michigan Lake Trout, by Louella E. Cable, Fishery Bulletin 107 (From Fishery Bulletin of the Fish and Wildlife Service, vol. 57), 62 pp., illus., printed 45 cents, 1956.

MISCELLANEOUS PUBLICATIONS

THESE FUBLICATIONS ARE NOT TYPILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM. CORRESPONDENCE RECARDING PUBLICATION THAT FOLLOW SHOULD BE ADDRESSED TO THE RESPECTIVE ORGANIZATION OR PUBLISHER MENTIONED, DATA ON PRICES, IF READITY AVAILABLE, ARE SHOWN.

"Agriculture, Food Supplies, and Atomic Radiation." article, Science, vol. 124, no. 3211, July 13, 1956,

pp. 63-66, printed, single copy 25 cents, Science, 1515 Massachusetts Ave., Washington 5, D.C. This article is the text of the summary report of the Committee on the Effects of Atomic Radiation on Agriculture and Food Supplies. The report is one part of a study of the biological effects of atomic radiations conducted by the National Academy of Sciences with the support of the Rockefeller Foundation. It discusses tracer studies in agriculture, crop production, animal production, radioisotopes in agricultural products and foods, environmental changes and ecological studies, and the use of radiation as a means of preserving certain foodstuffs.

Appraising the Market for the Services You Offer, by Edward L. Anthony, Small Marketers Aids no. 15, 4 pp., printed. Small Business Administration, Washington 25, D.C., August 1956.

"Are Fish Disturbed by the Echo-Sounder?" by J. Scharfe, article, Fischereiwelt, vol. 2, no. 2, February 1951, pp. 30-31, printed in German. (Translated from German and summarized by Dr. G. Mares, Pacific Biological Station, Nanaimo, B.C., Canada,)

Amount of Herring Spawn Deposited in British Columbia Coastal Waters in 1956, by D. N. Outram, Circular no. 42, 13 pp., illus., processed. Pacific Biological Station, Fisheries Research Board of Canada, Nanaimo, B.C., Canada, August 1956. Pacific herring, Clupea pallasi, spawn in shallow water along the shoreline of British Columbia. The majority of eggs are deposited on vegetation, in or just below the intertidal zone, i.e., between the high and low tide levels. Spawning grounds may vary in size from a few yards to several miles, the length and width being largely determined by the distribution of the vegetation and the stage of the tide at time of spawning. The spawning grounds are not randomly distributed along the coastline but are found in certain preferred regions year after year. The measurement of the extent and intensity of herring spawnings along the British Columbia coast is carried out annually by the Canadian Department of Fisheries. This paper discusses the purpose of the spawn surveys, survey methods, and the results of the 1956 spawn sur-

Arsberetning fra Fiskeriministeriets Forsøgslaboratorium for 1955 (Annual Report to the Danish Fishing Industry), 55 pp., illus., printed in Danish with English translation of the main experimental results. Fiskeriministeriets Forsøgslaboratorium, København, Danmark, 1956. Describes the results of the following experiments: fat determination in herring and sand eels; determination of the nutritional value of fish for fur-animal feed; chilling of fish; combination of icing and chemical preservation of fish; washing and painting fish boxes to improve hygienic conditions; light-salted salmon substitute; freezing shrimp; freezing gar-pike; freezing breaded fish products; freezing in jelly; freezing fish fillets; installations for infra-red cooking of sardines; Norway lobster; fish balls; research on cans; fish meal; and fish silage.

"Average Lunar Month Catch of Sardine Fishermen in Southern California, 1932-33 through 1954-55," by Frances N. Clark, article, California Fish and Game, vol. 42, no. 4, October 1956, pp. 309-322, illus., printed, California Department of Fish and Game, Sacramento, Calif. The summary of this report states that "By developing new rules for determining which boats were fishing for sardines each season, the return to the southern California fishermen per lunar month has been carried through 1954/55. After almost complete collapse in 1952/53 and 1953/54, fishing in 1954/55 was more successful. In this season, however, the average monthly catch was still less than in any previous season except 1947/48 and the two mentioned above. Based on the total boat months calculated to be required to make each season's catch, the relative strength was measured for 22 year-classes occurring in the fishery between 1932/33 and 1954/55. In the 1930's only two year-classes were of less than average strength, while in the 1940's and 1950's nine were below average and only four were above. During 18 seasons the within-season average monthly catch in southern California showed an increasing de-cline year by year. In the 1930's fishing success held up through February, in the early 1940's only through January, in the late 1940's only through December, and in the early 1950's only through Nevember." only through November.

Balik ve Balikcilik (Fish and Fishery), vol. IV, no. 9, September 1956, 190 pp., illus., printed in Turkish and English. Et ve Balik Kurumu, Istanbul, Turkey. A special issue of a monthly publication of the Meat and Fish Office which contains, among others, the following articles: "Fisheries Administration in Turkey;" "Development of Refrigeration in the Fishing Industry in Turkey;" "A Brief Review of the Turkish Canning Industry:" "Fisheries Research in Turkey;" "Recent Developments in Fishing;" and "Report on the Improvement of Gir-Gir Seines."

The Biological Effects of Atomic Radiation, Summary Reports, 120 pp., printed. National Academy of Science, Washington, D.C., 1956. Contains, among others, a summary report on effects of atomic radiation on oceanography and fisheries. An attempt has been made to summarize what is known about the actual and potential effects of radioactive materials in the oceanic realm and the interest of marine scientists in these substances. Answers are given to the following questions: (1) how does the atomic energy program affect the oceans; (2) is there naturally occurring radioactivity in the sea; (3) have weapons tests added measurable amounts of radioactivity to the sea; (4) in what other ways will radioactive materials be added to the oceans; (5) has the atomic energy program as yet resulted in serious damage to marine life; (6) do living things take up radioactive materials into their bodies; (7) are all the radioactive elements equally harmful; (8) how much radioactive waste will be produced by nuclear power reactors in the future;

- (9) what means are being considered for disposing of radioactive wastes; (10) will it be safe to introduce very large quantities of radioactive wastes from atomic power indiscriminately into the sea; (11) does this mean that large quantities of radioactive wastes should never be dumped in the sea; and (12) from what is known, where would be the safest place to dump radioactive wastes in the sea?
- Boletim da Pessa (Fishery Bulletin), vol. X, no. 52, September 1956, 134 pp., illus., printed in Portuguese. Gabinete de Estudos das Pescas, 211 Avenida da Liberdade, Lisbon, Portugal, Contains, among others, the following articles: "O Aproveitamento das Lagostas do Noroeste Africano (Utilization of Lobsters of North Africa)," by Dr. C. Fernando Costa; and "Alguns Aspectos Significativos da Industria da Pesca em Portugal" (Some Significant Aspects of the Fisheries of Portugal), by Dr. Richard J. Houk.
- Bulletin of the Faculty of Fisheries, Hokkaido University, vol. 6, no. 3, pp. 191-233, illus., printed in Japanese with summaries in English. Faculty of Fisheries, Hokkaido University, Hokodate, Japan, November 1955. Contains among others the following scientific papers: "Mechanical Studies of Fishing Net Materials. IV. A Method of Measuring the Diameter of a Netting Cord," by Tetsuo Miura; and "Studies on the Organic Phosphates in Muscle of the Aquatic Animals. I. On the Determination of Adenosine-polyphosphates in Muscle of Carp," by Tsuneyuki Saito and Ken-ichi Arai.
- Bulletin of the International Oceanographic Foundation, vol. 2, no. 2, July 1956, pp. 66-127, illus., printed. The Marine Laboratory, University of Miami, Coral Gables, Fla. Includes, among others, the following articles: "More to Fishing than Fish," by F. G. Walton Smith; "Saltwater Gamefish;" "Floating Fish Factories," by Robert W. Ellis; "Rivers in the Sea;" "Treaders of the Sea," by J. L. McHugh and Hilary B. Moore; "The Amazing Angel Shark," by Bernard L. Gordon; and "Ups and Downs at Sea," by Hilary B. Moore.
- (California) Abstract of Commercial Fisheries Laws of California, 1955-1957, folder, illus., printed. Department of Fish and Game, 926 Jay St., Sacramento 14, Calif., 1955.
- (Canada) Journal of the Fisheries Research Board of Canada, vol. 13, no. 4, July 1956, pp. 449-598, illus., printed. Fisheries Research Board of Canada, Ottawa, Canada. Contains, among others, the following articles: "Populations of Herring (Clupea harengus L.) in Newfoundland Waters," by S. N. Tibbo; "piet-Induced Differences in the Weight-Length Relationship of Aquarium Fed Sardines (Sardinops caerulea)," by David A. Farris; "The Effect of Fry Plantings on Whitefish Production in Eastern Lake Ontario," by E. D. Lapworth; "Chemical Changes in Nitrite-Treated Atlantic Cod Fillets in Relation to Spollage Assessment," by E. B. Vaisey; and "Storage of Frozen Rosefish Fillets," by W. J. Dyer, Margaret L. Morton, Doris I. Fraser, and E. G. Bligh.

- (Ceylon) Administration Report of the Acting Director of Fisheries for 1955 (Part IV-Education, Science, and Art), by H. C. Goonewardena, 29 pp., printed. Government Publications Bureau, Colombo, Ceylon, July 1956. Progress reports for the year 1955 are presented by the Department of Fisheries! Administration and Socio Economic Division, Development Division, Commercial Section, and Research Division. Among the subjects covered are: enforcement of fisheries regulations; cooperative development of the fisheries; mechanization of fishing craft; fresh-water fishery development; and fishery byproducts. Statistical data are also included on the production of fresh and cured fish, and imports and exports of fishery products and byproducts.
- (Coast and Geodetic Survey) Tide Tables, Current Tables, and Tidal Current Charts, 1956 and 1957, 50 cents each. U.S. Coast and Geodetic Survey, Washington 25, D.C. The tide tables cover the East Coast, North and South America; and West Coast, North and South America. The current tables cover the Atlantic Coast and the Pacific Coast. The tidal current charts include the Boston Harbor, Long Island Sound and Block Island Sound, New York Harbor, Delaware Bay and River, Tampa Bay, San Francisco Bay, Puget Sound-northern part, and Puget Sound-southern part.
- The Conservation Directory (A Listing of Organizations and Officials Concerned with the Protection of Wildlife and Other Natural Resources). compiled by Stewart M. Brandborg, 103 pp. printed, 40 cents. National Wildlife Federation, July 1, 1956. This, the forty-eighth Conservation Directory, is larger and more complete than any earlier edition. As in previous years, the public agencies of national, state, and territorial governments of the United States concerned with the protection of wildlife and other resources (including fisheries) are listed, as well as those of neighboring nations in North and South America. Most of the nongovernment organizations within the United States which have a national or statewide scope of interest are also included.
- The Deep-Sea Fisherman, by Captain I. E. Allison, 90 pp., illus., printed. The Educational Supply Association, Limited, Esavian House, 181 High Holborn, London, W. C. 1, England, 1956. Although this booklet has been designed primarily for children between the ages of 8 and 12, adults will be interested in reading the straightforward description of the various methods of fishing used today, the parts of a modern trawler and its equipment, the duties of the various crew members, fish and their habits, a typical fishing voyage, the marketing of the catch, and the use of fishery byproducts. The author is the principal of The Nautical College, Hull, England. Considerable detail is covered in this small booklet, including what goes on aboard a fishing trawler and how the crew spend their time at sea. The booklet is well illustrated with photographs and line drawings. Divided into seven chapters, the

booklet is very interesting and will be of value to the novice as well as to the one more familiar with fishing and fisheries.

"Developments in Mid-Water Trawling (Electronic Aids to Depth Regulation)," article, World Fishing, vol. 5, no. 9, September 1956, pp. 50-52, illus., printed. John Trundell Ltd., Temple Chambers, Temple Ave., London, E.C. 4, England. This is an abstract of a paper by W. Lochridge, given at a meeting of the Institution of Engineers and Shipbuilders in Scotland. The paper was under the title "Mechanization in Fishing Vessels," and deals largely with development in fish factoryships. This article discusses the development of other trawls suitable for the small North Sea trawler and the larger ships of the Hull distant-water fleet. Trawling tests are described as well as a new stern design.

Die Seefischerei Nordwest-Europas (Struktur und Probleme), The Sea Fisheries of North-West Europe (Structure and Problems), by Dr. Wilhelm Blanke, 626 pp., illus., printed in German with the tables in both German and English, DM78 (about US\$19.00), 1956. Krogers Buchdruckerei Abt. Fachbuchverlag, Bahnhofstrasse 17, Hamburg-Blankenese, West Germany, 1956. An exhaustive and very comprehensive treatise on the sea fisheries of North-West Europe. This book brings economic research work on fisheries to a new point, particularly with regard to interregional comparisons and to fisheries politics. For practical purposes it is an excellent work of reference. According to the publishers, the study was sponsored by many German and foreign organizations, administrative boards and author ities, including the Association of the German Deep Sea Fisheries and the Bremerhaven Chamber of Commerce and Industry. The work was completed by the Research Division for Fisheries Economics of the Bremen Committee for Economic Research. The detailed data contained in this book are well organized and presented Chapter 1 deals first with the sea fisheries in the world and in North-West Europe and includes information on total catch and utilization, fishing fleets and fishermen, and exports of fish and fishery products. For North-West Europe, data on national income and landings by domestic fishing craft are also covered. The development and structure of the sea fisheries in each of the North-West European countries makes up the second part of chapter 1. The countries included are Norway, Sweden, Denmark, Faroes, West Germany, Netherlands, Belgium, France, Eng-land and Wales, Scotland, North-Ireland, Eire, and Iceland. Problems of the North-West European sea fisheries are discussed in the second chapter, with the first part concentrating on inter-regional problems and the second part with regional problems for each of the countries mentioned above. Half of the book consists of an appendix the major part of which is statistical tables giving data on landings of sea fish by species, by country, by type of fleet, as well as data on number of fishermen, number of vessels, external trade, national fisheries income, and details on other phases of the fisheries. textual part of the tables is presented in both German and English which makes them very

useful for those who cannot read German, Most of the statistics are for the years 1950-1954. Also included in the appendix is a list giving the scientific, German, Norwegian, English, and French names of principal sea fish and shellfish; and principal technical terms in German, English and French. In my opinion, this book should be of considerable value to businessmen, researchers, students, and others interested in the European fisheries, in particular, or fisheries in general.

-- J Pilegg

Economic Marine Algae of Tropical South and
East Asia and Their Utilization, by J. S.
Zanefeld, Special Publications No. 3. IndoPacific Fisheries Council, Mallwam Mansion,
Phra Atit Road, Bangkok, Thailand, 1955.

Exploring the Deep Pacific, by Helen Raitt, introduction by Roger Revelle, 272 pp., illus., printed, \$3.75. W. W. Norton & Co., 55 Fifth Ave., New York 3, N. Y. Unofficial account of an oceanographic expedition in the South Pacific.

Fisheries Statistics of the Philippines, 1955, by Jose R. Montilla and Justo R. Montemayor, 64 pp., processed. Department of Agriculture and Natural Resources, Bureau of Fisheries, Manila, Philippines. This report is devoted to fishery production in the Philippines. The tables are grouped together under the headings (1) production, consumption, and requirements; (2) commercial fishing vessels; (3) fish ponds; (4) foreign trade; and (5) other data. The tables are subdivided according to gear used, kind of fish caught, monthly production, and fishing grounds. There are also statistics on fish pond production, and imports and exports of fishery products (including canned and processed fish). Statistics also cover reptile skins, seaweeds, sharkfins, shells, sponges, trepang, turtle eggs, and turtle shells. The appendices contain information on the fishery districts, the forms used in collecting fishery statistics, and an inventory of fishing gear used in the Philippines for the year 1953. Except for Table 1 which presents fish production data since 1946, most of the information covers the five-year period 1951-55.

"Fishermen's Organizations and the Regulation of Fish Prices in Sweden," by Christian Hessle and Sigmund Verstandig, article, FAO Fisheries Bulletin, vol. IX, no. 3, July-September 1956, pp. 130-143, printed. Food and Agriculture Organization of the United Nations, Rome, Italy. This article is a summary of Parts 2-5 of the monograph of the same title. Part I, a general survey of Swedish fisheries, the fishing population, trade and government administration, has been excluded from this summary. Part 2 discusses the early development of the fishermen's organizations in Sweden; Part 3, the fishermen's professional organizations; Part 4, the fishermen's trading organizations; and Part 5, price regulations.

"Fishing with Electricity," by B. Hnatevic, Bulletin of the Czechoslovak Academy of Agricultural Sciences, No. 1-2, 1953, pp. 101-109, printed in Czechoslovak. (Translated from Czechoslovak

and summarized by Dr. G. Mares, Pacific Biological Station, Nanaimo, B.C., Canada.)

- Fiskeri-Beretning for Arêt 1955, 198 pp., illus., printed in Danish with resume in English. I Kommission Hos G. E. C. Gad, Kobenhavn, Denmark. This report contains detailed statistics on the Danish fisheries for the calendar year 1955. Included in the report are data on number of fishermen, number of fishing craft, value of fishing vessels, catch by species, landed value of the catch, resumes by fisheries, and imports and exports of fishery products.
- (FAO) General Fisheries Council for the Mediterranean, Proceedings and Technical Papers no. 3, 527 pp., illus., printed in French and English, \$5. Food and Agriculture Organization of the United Nations, Rome, Italy, 1955. (Available from Columbia University Press, International Documents Service, New York 27, N.Y.) This document is divided into two parts. The first part includes the proceedings of the third meeting of the General Fisheries Council for the Mediterranean held in Monaco (Principality), October 14-19, 1954. The second part comprises the technical papers presented during this meeting. Among the subjects covered are various aspects of sardine biology; freezing of sardines; fisheries of certain French ports; transportation and preservation of fish in Spain; organization of fish trade in Italy; carp culture in rice fields; water pollution; fisheries administration in Yugoslavia; "The Mediter-ranean Spiny Lobsters" (description of Palinurus vulgaris, P. mauritanicus and P. rissoni); vocational training of fishermen; fish meal; economic fishery statistics in Yugoslavia; sea fry for stocking inland waters; safety measures for divers; fish curing in Yugoslavia; cold storage and canning of mackerel; "Improvement of Large Marine Crustacean Fishing Technique in Yugoslavia" (describes use of collapsible pots for fishing lobsters and spiny lobsters); Salmonidae breeding in Mediterranean countries; short-finned tuna (Sarda sarda in Turkish waters); Black Sea coast fisheries; Norway lobster in Adriatic; natural bait for marine fishing; Mediterranean tunas (little tuna, Euthynnus alliteratus Raf.; and striped-bellied bonito, Katsuwonus pelamis L.); French River fisheries.
- (FAO) The State of Food and Agriculture, 1956, 151 pp., illus., printed, \$1.50. Food and Agriculture Organization of the United Nations, Rome, Italy, 1956. (Also available from Columbia University Press, International Documents Service, 2960 Broadway, New York 27, N.Y.) The foreword points out that, "The world food and agricultural situation has recently tended to change less rapidly than during the years of postwar recovery. It has therefore seemed fitting to modify the form of the annual report on the state of food and agriculture, giving less emphasis to the current situation and short-term outlook and more to longer-term problems and to other special subjects which in the past it has not been possible to treat in detail. Last year's report consisted of a review of the developments of the whole postwar decade. This year the food and agricultural situation in 1955/56 and the out-

- look for 1956/57 are reviewed in a single chapter. The two following chapters, the first of the new series of special studies, deal respectively with some factors influencing the development of international trade in agricultural products, and with general trends and outlook in the world's fisheries. The report is introduced by the customary summary." The chapter on "World Fisheries: General Trends and Outlook with Examples from Selected Countries" discusses the characteristics of world production and trade; government policies in relation to the fishery industries; and typical cases of fishery development under different economic influences in Japan, Norway, Iceland, United Kingdom, Germany, United States, Canada, and the Union of South Africa and South-West Africa. Also presents current fishery development programs and outlook.
- Food Expenditures of Households in the United
 States, Preliminary Report, 16 pp., processed.
 U.S. Department of Agriculture, Washington 25,
 D.C., August 1956. This report presents some
 preliminary results on food expenditures from
 a nationwide survey of household food consumption made in April-June 1955. Although food
 products are not broken down by specific categories, the general information may be of value
 to fisheries processors.
- The Food and Feeding Habits of the Lemon Sole, by Bennet B. Rae, Scottish Home Department Marine Research No. 3, 35 pp., illus., printed, 6s. 8d. (92 U.S. cents). Her Majesty's Stationery Office, 13A Castle St., Edinburgh 2, Scotland, 1956.
- "Growing Culture Pearls in Australia," article,
 Fisheries Newsletter, vol. 15, no. 7, July
 1956, pp. 5, 7, illus., printed. Commonwealth
 Director of Fisheries, Department of Primary
 Industry, Canberra, Australia. Culture pearls
 will soon be produced for the first time in Australia, according to this article. If pilot scale
 operations are successful, it should mean the
 establishment of a new industry where development is badly needed, in northwest Australiaan industry which could become a substantial
 dollar earner along with spiny lobster tails,
 shrimp, and pearl shell.
- How to Use Sodium Bisulfite to Control "Black Spot" on Shrimp, Special Service Bulletin No. 12, 4 pp., illus., printed. The Marine Laboratory, University of Miami, Coral Gables, Fla., August 1956. Research has shown that shrimp dipped in a dilute solution of the harmless chemical, sodium bisulfite, develop much less black spot than untreated shrimp. This report quotes the Food and Drug Administration's approval of this technique, and describes in detail the method of using sodium bisulfite on shrimp.
- The Importance of Chilling Fish, by C. L. Cutting and J. Liston, D.S.I.R. Food Investigation Misc. Paper No. 7A/56, 2 pp., illus., printed. (Reprinted from Fish Trades Gazette, April 14, 1956.) White Fish Authority, Torry Research

Station, Aberdeen, Scotland. Describes briefly the importance of chilling fish and the effect of temperature on bacterial growth. The authors state that, "For practical purposes the quickest, safest and easiest way to cool fish to about 32° F. and keep them at this temperature is to surround them and mix with them liberal amounts of crushed ice. Simply putting fish without ice into a chill room at 32° F. will cool them down very much more slowly even if the fish are laid out singly. Fish contained in wooden boxes put into a chill room without ice will cool down even more slowly since wood is a good heat insulator. Direct and intimate icing, therefore, because of its superior cooling action, ensures that spoilage of the fish during the cooling down period is reduced to a minimum."

Index Oyster Ground Franchises and Leases (Licenses, Vessels, and Individuals), July 1953-July 1955, 18 pp., printed. Shell Fish Commission, 185 Church St., New Haven, Conn. Contains excerpts from the shellfish laws; leasing of shellfish grounds; alphabetical lists of individuals and vessels licensed to work on the natural beds; list of owners and acreages by lot number as of July 1, 1955; leased grounds as of July 15, 1955; and general oyster statistics.

(India) Progress of Fisheries Development in India, 96 pp., figs., illus., printed. Central Inland Fisheries Research Station, Orissa, India, 1956, Contains the following papers: "Fisheries and Fishing Industry in India," by B. N. Chopra; "The Second Five-Year Plan of Fisheries Development." by D. Bhatia; "Marine Fisheries Development." by D. Bhatia; "Marine Fisheries Research in India," by N. K. Panikkar; "Inland Fisheries Research and Extension in India," by B. S. Bhimachar; "Deep Sea Fishing in Indian Waters," by K. Chidambaram; "Mechanisation of Indian Fishing Craft," by P. B. Ziener; "Reclamation of Swamps for Fishery Development in Orissa," by G. N. Mitra; "Fish Culture Techniques in India," by K. H. Alikunhi; "Fish Preservation and Processing," by R. Venkataraman, "Fish Oil Industry in India," by Sundar Kini; "Fisheries By-Product Industry in India," by G. B. Mohanty; and "Socio-Economic Development of Fishermen Communities in India," by T. V. R. Pillay.

"Injuries Done to Trouts by Electric Fishing," by Fr. Volf, article, Bulletin of the Czechoslovak Academy of Agricultural Sciences, No. 1-2, 1953, pp. 104-109, printed in Czechoslovak, (Translated from Czechoslovak and summarized by Dr. G. Mares, Pacific Biological Station, Nanaimo, B.C., Canada.)

(Institute of Freshwater Research) Annual Report for the Year 1954 (and short papers), Report No. 36. Institute of Freshwater Research, Drottningholm, Sweden, 1956.

(Institute of Seaweed Research) Annual Report for 1955 and Review of Institute's Activities, 1945-1955, 52 pp., illus., printed. Institute of Seaweed Research, Inveresk, Midlothian, Scotland. This report reviews not only the work of the Institute of Seaweed Research during 1955 but also the achievements of the last ten years;

that is, since the work began. It indicates the successes achieved in elucidating many of the scientific problems associated with the biochemistry, plant physiology, and ecology of the marine algae and the fundamental chemistry of their constituents; the development of techniques for the manufacture of algal chemicals and seaweed harvesting, and the assessment of their value in agriculture and medicine. This work has aided the development in this country of a new industry based on seaweed and has stimulated great interest in practically every maritime country in the world. As indicated in the report, the Institute, having fulfilled its original mandate, has reduced the scope of its activities. Its main concern will now be the support of fundamental seaweed studies at the universities, the maintenance of an information service, the supply of algal chemicals at cost and the provision of technical assistance and advice to those interested in seaweed utilization in the crofting communities in Scotland.

(International Law Commission) Addendum to Comments by Governments on Provisional Articles Concerning the Regime of the High Seas and the Draft Articles on the Regime of the Territorial Sea Adopted by the International Law Commission at its 7th Session, A/CN. 4/99/Add. 1, 103 pp., processed, April 5, 1956. United Nations, International Law Commission, New York, N.Y. The following addenda also have been issued. A/CN. 4/99/Add. 2, 11 pp., April 17, 1956; A/CN. 4/99/Add. 3, 2 pp., April 25, 1956; A/CN. 4/99/Add. 3, 5 pp., April 35, 1956; A/CN. 4/99/Add. 7, 4 pp., May 7, 1956; A/CN. 4/99/Add. 7, 4 pp., May 72, 1956; A/CN. 4/99/Add. 7, 4 pp., May 22, 1956; a/CN. 4/99/Add. 3, 6 pp., June 25, 1956.

(International Law Commission) Co-operation with Inter-American Bodies. Report of the Secretary on the Proceedings of the 3rd Meeting of the Inter-American Council of Jurists Held at Mexico City, Jan. -Feb. 1956, A/CN. 4/102, 45 pp., processed. United Nations, International Law Commission, New York, N.Y., April 12, 1956. The following correction and addendum also have been issued: A/CN. 4/102/Corr. 3, 1 p., May 18, 1956; and A/CN. 4/102/Add. 1, 1 p., May 7, 1956.

(International Fisheries Convention, 1946) Report of the AD HOC Committee Established at the Fourth Meeting of the Permanent Commission, September 1955, 45 pp., illus., processed. Office of the Commission, International Fisheries Convention, London, England, September 1956. At the meeting in London in 1955 the Permanent Commission decided to try to establish a satisfactory scientific basis for the conservation of the various fisheries within the Permanent Commission area by asking a working group of specialists some basic questions. This is a report on most of the questions put to the Committee. The subject matter is considered under six headings, as follows: (1) selectivity of meshes; (2) assessment of long-term effects of applying various cod-end mesh sizes; (3) assessment of immediate effects of applying various

cod-end mesh sizes; (4) report on size limits in relation to the above results; (5) alterations or additions to Annex II or Article 6 of the Convention, proposed by member countries; and (6) recommendations for further research. The results presented in this report refer only to species and fisheries within the Convention area where the 80-mm. mesh size is in effect, and are based on the latest information available to the Committee at the time of their last meeting (May 1956).

- (International Law Commission) Report of the International Law Commission Covering the Work of Its Eighth Session, 23 April - 4 July 1956, A/CN. 4/104, 137 pp., processed. United Nations-General Assembly, International Law Commission, New York, N. Y., July 7, 1956. The International Law Commission held its eighth session at the European Office of the United Nations, Geneva, Switzerland from April 23 to July 4, 1956. The work of the Commission during the session is related in the present report. Chapter I covers the organization of the session. Chapter II contains the Commission's final report on the law of the sea; Chapter III consists of progress reports of work on the subjects of law of treaties, state responsibility, and consular intercourse and immunities; while Chapter IV deals with questions relating to the statute of the Commission and with administrative matters.
- International Technical Conference on the Conservation of the Living Resources of the Sea, Rome, 1955, United Nations Document A/Conf. 10/6, 20 pp., printed. United Nations, New York, N.Y., 1955.
- The Investigations of Demersal Fish Resources in the East China and the Yellow Seas (3), 140 pp., illus., printed in Japanese with summaries in English. Seikai Regional Fisheries Research Laboratory, Maruo-Machi, Nagasaki City, Japan, March 1956. Contains the following articles: "A Statistical Account of the Japanese Trawl Fishery in the East China and the Yellow Seas after War II," by Shigeaki Shindo; and "Geographical Distributions of the Fishing Effort in the Fishing Grounds for Trawl Fishery in the East China and the Yellow Seas," by Osamu Kibesaki.
- Iowa Fish and Fishing, by James R. Harlan and Everett B. Speaker, 377 pp., illus., printed, \$2.50. State Conservation Commission, East 7th and Court, Des Moines 9, Iowa. This is the third edition of an interesting book on fish and fishing in Iowa. Text changes are made throughout and nomenclature brought up to date. It presents new chapters on natural baits and baiting, fishing tackle, and fish distribution; a major revision and extension of text on angling; and a new section on state-owned access to fishing waters.
- Jaarciffers Over de Visserij Gedurende Het Jaar 1955 (Annual Fisheries Statistics, 1955), Verslagen en Mededilingen van de Directie van de Netherlands with titles in English. Directie van de Visserijen, 's-Gravenhage, Netherlands, 1956. This report not only contains complete statistics on all fishing activities in the Nether-

- lands but it also gives considerable descriptive information on the sea fisheries, inshore fisheries, river and inland fisheries, government regulations, whale fisheries, herring exports, fisheries research, and the fishing fleet.
- (Jamaica) Report on Jamaica for the Year 1955, 386 pp., illus., printed, 7s.6d. (US\$1.05). The Government Printer, Duke Street, Kingston, Jamaica, 1956. An annual report on developments in Jamaica during 1955. Contains, among many others, a chapter on the Jamaican fishing industry which states that "the natural evolution of the industry has been limited by the geography of the Island. The surrounding shallow-water shelf is not extensive -- on the north coast it extends only a few hundred yards in some areas -- and beyond this the seabed slopes sharply into water too deep to permit bottom fishing to be carried out efficiently without the use of power equipment. In consequence, the industry has not risen above a peasant-level operation, and even the extension of fishing onto the offshore Pedro Cays has done little to change this, the fishing being carried out by traditional canoes with large powered craft providing servicing facilities " Descriptions of the fishing areas of Jamaica, methods of capture, development of the fresh-water fisheries and the marine fisheries are presented.
- (Japan) Statistic Tables of Fishing Vessels (as of the End of 1955), General Report No. 8, 240 pp., printed in Japanese and English. Japanese Fisheries Agency, Tokyo, Japan. This annual report lists data on the various types of Japanese fishing craft as obtained by a fishing-vessel registration system. Statistics are given by types of gear, fishery, craft, and principal prefectures, together with comparisons for former years.
- "The Larsen Mid-Water Trawl," by Alan Glanville, article, FAO Fisheries Bulletin, vol. IX, no. 3, July-September 1956, pp. 113-129, illus., printed. Food and Agriculture Organization of the United Nations, Rome, Italy. According to the author, the Larsen mid-water trawl has proved so effective that it is now in regular use in Scandinavia and other parts of Europe. Herring, sprat, anchovies, mackerel, and other pelagic fish are commonly caught with this gear which, owing to its low initial cost and simple operation by relatively small crews, may in some cases supplant the much more expensive ring nets and purse seines. This article discusses the method of operating the Larsen mid-water trawl, its advantages and disadvantages, conditions necessary for successful operation, and installation and operation of the gear.
- "Measurement of Denaturation of Fish Protein," by J. I. M. Ironside and R. M. Love, article, Nature, vol. 178, no. 4530, August 25, 1956, pp. 418-419, printed. MacMillan & Co., Ltd., St. Martin's St., London, W. C. 2, England.
- (Malaya) Annual Report of the Fisheries Division, Department of Commerce and Industry, Singapore 1953, by Tham Ah Kow, pp. 205-250,

illus., printed. Department of Commerce and Industry, Singapore, Malaya. Includes a general review of the fishing industry of Singapore, inventory of the fishing industry, availability of fresh fish, the fresh fish trade, prices of fresh fish, prices of producer goods, and trade in salt fish and certain marine products.

- (Malaya) Annual Report of the Fisheries Division, Department of Commerce and Industry, Singapore 1954, 15 pp., printed. Department of Commerce and Industry, Singapore, Malaya. This report gives a general review of Singapore's fishing industry, availability of fresh fish, marketing, prices of fresh fish, and trade in salt fish and certain marine products.
- Maryland Board of Natural Resources, Twelfth Annual Report, 1955, 215 pp., illus., printed.
 Board of Natural Resources, Annapolis, Md. A report for the fiscal year beginning July 1, 1954, and ending June 30, 1955, covering the activities, accomplishments, and recommendations of the several departments represented on the Board, including the Department of Tidewater Fisheries, the Department of Game and Inland Fish, and the Department of Research and Education. Under the Department of Tidewater Fisheries are discussed oysters, clams, blue crabs, fishing gear, fish abundance, striped bass investigations, and fishery statistics. Also contains an appendix which describes a survey of unlicensed commercial fish nets.
- Nature's Guardians (Your Career in Conservation), by Harry Edward Neal, 192 pp., illus., printed, \$3,50. Julian Messner, Inc., 8 West 40 Street New York 18, N. Y., 1956. This book will be a welcome and valuable addition to every high school and college library. As a vocational guidance aid that is written in popular style, it provides timely and practical information for persons interested in both the professional and nonprofessional employment opportunities in the important field of fisheries, forestry, soil and wildlife conservation. Probably no decision has a greater bearing on a person's outlook on life than the successful choice of a career. It is a decision that can lead to years of happiness and satisfaction or, which is too frequently the unfortunate case, frustration and disappointment. In his review of the opportunities that exist in the conservation field, the author presents the type of interesting information that will lead to further investigation by those interested in conservation careers, as well as provide enjoyable reading for those not so interested. To the further credit of the author, he not only covers the attractive phases of conservation management, but makes practical comment on many of the disadvantages of various federal and state employments. In his very realistic approach to the opportunities existing in the field, the author appropriately lists the opportunities and compensations that can be expected. While it was undoubtedly the decision of the author to confine his coverage to conservation activities, this reviewer has the feeling that the value of the book could have been considerably enhanced by including some coverage of employment opportunities in the allied fields of commercial ex-

ploitation of our natural resources. Such coverage might have stimulated additional interest on the part of many young persons who wish to look beyond early careers in Federal and state conservation activities to later service in private industry. As a supplement to the information on employment opportunities and references to governmental and nongovernmental conservation organizations and conservation magazines, the author provides a carefully selected bibliography of publications dealing with fishery, forestry, soil, and wildlife, conservation subjects. It is the opinion of this reviewer that Nature's Guardians will be similarly referred to as recommended reading in future books relating to conservation management.

--D. Y. Aska

- (Norway) Lofotfiskets Lønnsomhet 1954 (Lofot Fishery Profitability 1954), by Kare Ruud, Fiskeridirektoratets Smaskrifter Nr. 5 (Fishery Directorate Pamphlet No. 5), 20 pp., printed in Norwegian. (Reprinted from Fiskets Gang, no. 38, 1954.) A/S John Griegs Boktrykkeri, Bergen, Norway, 1954.
- Observations on the Spawning Runs of Brown Trout in the South Queich, Loch Leven, by W. R. Munro and K. H. Balmain, Scottish Home Department Freshwater and Salmon Fisheries Research no. 13, 16 pp., illus., printed, 4s. 6d. (65 U.S. cents), Her Majesty's Stationery Office, 13A Castle St., Edinburgh 2, Scotland, 1956.
- Observations on the Taxonomy, Biology, and Ecology of the Engraulid and Clupeid Fishes in the Gulf of Nicoya, Costa Rica, by Clifford L. Peterson, Bulletin vol. 1, no. 5, pp. 139-280, illus., printed in English and Spanish. Inter-American Tropical Tuna Commission, La Jolla, Calif., 1956.
- "Oceanography, Fisheries, and Atomic Radiation," article, Science, vol. 124, no. 3210, July 6, 1956, pp. 13-16, printed, single copy 25 cents. Science, 1515 Massachusetts Ave. NW., Washington 5, D.C. This article is the text of the summary report of the Committee on the Effects of Atomic Radiation on Oceanography and Fisheries. The report is part of a continuing study on the biological effects of atomic radiation conducted by the National Academy of Sciences with the support of the Rockefeller Foundation. It discusses how the atomic energy program affects the oceans, radioactivity in the sea, damage to marine life, radioactive waste, and the use of radioactive materials to study the ocean and fisheries.
- Old Fourlegs: The Story of the Coelacanth, by J. L. B. Smith, 270 pp., printed, 21s. (US\$2.94). Longmans, Green & Co., 55 Fifth Avenue, New York 3, N. Y. The story of the author's hunt for this "prehistoric fish," it ecoelacanth.
- Our Vanishing Shoreline, 36 pp., illus., printed.
 National Park Service, U. S. Department of the
 Interior, Washington 25, D. C. A report of a
 survey made in 1954 of the seashore recreation
 area along the Atlantic and Gulf coasts, from
 Calais, Maine to Brownsville, Texas. The survey was made to learn how much of this area

has already been developed or spoiled, how much is left, and how much is suitable for public use.

- "Oyster Farming," by H. Van Pel, article, SPC (South Pacific Commission) Quarterly Bulletin, vol. 6, no. 3, July 1956, pp. 19-20, illus., printed. South Pacific Commission, Noumea, New Caledonia. According to the author, "Edible oysters are not cultivated in the South Pacific Commission area, although they are gathered in many places from the rocks or the mangrove roots on which they grow naturally. In most cases these oysters are misshapen or even stunted, often because they were too crowded on their supports, in other cases because the food supply is not adequate, sometimes because they have grown at an unsuitable level. Whenever it finds itself in a naturally suitable environment, the oyster grows well." This article describes the simple technique used by oyster farmers in the Philippines, where conditions for oyster cultivation are similar to those found in many parts of the South Pacific.
- Poisoning by Barracuda and Other Fishes, by Donald de Sylva, Special Service Bulletin #13, 10 pp., processed. The Marine Laboratory, University of Miami, Coral Gables, Fla., August 1956.
- Populations of the Black Mullet (MUGIL CEPHALUS L.) in Florida, by Donald P. de Sylva, Howard B. Stearns, and Durbin C. Tabb, TechnicalSeries No. 19, 45 pp., illus., printed. Marine Laboratory, University of Miami, Coral Gables, Fla., June 1956.
- "Presence of Fish and Echo-Indications," by A. Meyer, article, Die Fischwirtschaft, vol. 5, no. 2, February 1953, pp. 45-47, printed in German. (Translated from German and summarized by Dr. G. Mares, Pacific Biological Station, Nanaimo, B. C., Canada.)
- "Procedimientos de Conservacion del Pescado por el Frio" (Methods of Conserving Fish by Freezing), by Pedro Perez Adsuar, article, Revista del Frio, vol. 1, no. 2, April-June 1956, pp. 111-120, printed in Spanish. Centro Experimental del Frio, Madrid, Spain.
- Produccion Pesquera de la Republica Argentina Anos 1946-53 (Fish Production in the Argentine Republic, 1946-53). Ministerio de Agricultura y Ganaderia, Departmento de Investigaciones Pesqueras, Buenos Aires, Argentina, 1955.
- Protokolle zur Fischereitechnik (Journal of Fishery Technology), Heft 17, Bd. 4 (Vol. 4, no. 17), pp. 32-83, illus., processed in German, Institut fur Netz- und Materialforschung, Hamburg 36, Neuer Wall 72, Germany, May 1956. Contains the following articles: "Fangmethoden und Fanggerate beim Rochenfang in Deutschland" (Methods of and Gear for the Catching of Rays in Germany), by J. Scharfe; "Deutsche und Franzosiche Bezeichnungen von Fanggeraten" (German Schleppnetzen" (How to Measure Net Meshes in Trawl Nets), by A. v. Brandt; and "Langenveranderungen von Netzgarnen durch Wasserung"

- (Changes in the Length of Net Mesh and Net Thread by the Influence of Water), by G. Klust.
- Report to Congress on the Mutual Security Program (For the Six Months Ended June 30, 1956), 36 pp., illus., printed. Mutual Security Agency, Washington 25, D. C.
- Rio Parana, sus Peces mas Comunes, Pesca Comercial (The Most Important Fishes and the Commercial Fishery of the Parana River), by Juan Manual Cordini, Publicacion Miscelanea No. 410, 86 pp., illus., printed in Spanish. Ministerio de Agricultura y Ganaderia, Buenos Aires, Argentina, 1955.
- Salt-Water Aquarium Fish, by Herbert R. Axelrod and William Vorderwinkler, 160 pp., illus., printed, \$3.95. Sterling Publishing Co., Inc., 122 East 25th St., New York 16, N. Y.
- Sampling Methods Used in Japanese Fisheries
 Catch Statistics, Occasional Paper No. 55/2.
 Indo-Pacific Fisheries Council, Maliwan Mansion, Phra Atit Road, Bangkok, Thailand, 1955.
- Sbornik Ceskoslovenske Akademie Zemedelskych Ved, Zivocisna Vyroba (Annals of the Czecho-slovak Academy of Agricultural Sciences, Animal Production), Rocnik XXIX, Cislo 4 (vol. XXIX, no. 4), 1956, pp. 239-318, printed in Czechoslovak with summaries in Russian and English. The Czechoslovak Academy of Agricultural Sciences, Praha XII, Slezska, Czechoslovakia. Contains summaries in English of the following articles: "Purifying and Utilization of Waste Waters from Slaughterhouses and Factories of the Meat Industry in Fish Assimilation Ponds;" "Better Exploitation of the Natural Productivity of the Fish Ponds through Increase in Stocks of Fish;" "New Discoveries Concerning the Artificial Breeding of Pike;" "Investigation of the Reasons for Losses in Hatching of Trout Roe in Hatcheries;" and "Strange Life of the Eel (Anguilla anguilla L.)."
- Seamanship, by T. F. Wickham, 192 pp., illus., printed, \$3.75. Philosophical Library, Inc., 15 East 40th St., New York 16, N. Y., 1956. The author, who is the Seamanship Instructor at The National Nautical School, Portishead, Somerset, England, presents the basic aspects of the art of good seamanship in a simple and straightforward manner. The novice as well as the experienced seaman will find valuable information in this small book. However, basically it is a factual manual for the novice. Among the subjects covered by the book are ship routine and ships, rope work, compass and steering, rule of the road at sea, tides and buoyage, flags and signals, anchors and cables, mooring and berthing, cargo work, speed and soundings, and lifeboats.

--J. Pilegg

"Shell Disease in Portuguese Oysters," by H. A. Cole and G. D. Waugh, article, Nature, vol. 178, no. 4530, August 25, 1956, p. 422, printed. MacMillan & Co., Ltd., St. Martin's St., London, W.C. 2, England.

- Some Deaths Due to Fish Poisoning (Ichthyosarcotoxism) in India, by S. Jones, 8 pp., illus., printed. (Reprinted from Ind. Jour. Med. Res., vol. 44, no. 2, April 1956, pp. 353-360.) Central Marine Fisheries Research Sub-Station, Calicut, Malabar, India.
- Some Notes on the Ovary of Albacore, GERMO
 GERMO, Taken from the Coral Sea, by Kazumi
 Isii and Motoo Inoue, 6 pp., printed in Japanese with summaries in English. (Reprinted
 from Bulletin of the Japanese Society of Scientific Fisheries, vol. 22, no. 2, June 1956,
 pp. 89-93.) Japanese Society of Scientific Fisheries, Tokyo, Japan.
- <u>Statistical Abstract of the United States</u>, 1956, issued by the U. S. Department of Commerce, printed, \$3.75. For sale by Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.
- Studies of the Sexual Development and Spawning of Yellowfin Tuna (NEOTHUNNUS MACROPTERUS) and Skipjack (KATSUWONUS PELAMIS) in Three Areas of the Eastern Pacific Ocean, by Examination of Gonads, by Milner B. Schaefer and Craig J. Orange, Bulletin vol. 1, no. 6, pp. 283-349, illus., printed in English and Spanish. Inter-American Tropical Tuna Commission, La Jolla, Calif., 1956.
- "Studies on Deep Mass Culture of Algae in Israel," by A. M. Mayer, A. Eisenberg, and M. Evenari, article, The Scientific Monthly, vol. 83, no. 4, October 1956, pp. 198-203, illus., printed. The Scientific Monthly, 1515 Massa-chusetts Ave., NW., Washington 5, D. C. A deep unit for the mass culture of algae is described. A cheap method of agitation has been developed. Yields as high as 21 grams (dry weight) per square meter of illuminated area per day have been obtained. A yearly average for three algae species gave 16 grams per square meter of illuminated area per day. Yields calculated theoretically from the actual yield are as high as 32 grams. The suitability of Israel for mass culture is pointed out. It is considered that the present results bring the mass culture of algae toward the borderline of economic feasibility. Its practical feasibility may be taken as established.
- Trade News, vol. 9, no. 1, July 1956, 21 pp., illus., printed. Department of Fisheries of Canada, Ottawa, Canada. Contains among others the following articles: "Artificial Stream Produces Salmon;" "Some Factors Affecting the Shelf Life of Frozen Fish," by O. C. Young; and "The Fisheries of Turkey," by I. S. McArthur.

- (Union of South Africa) <u>Department of Nature Conservation</u>, P. O. Box 152, Stellenbosch, Union of South Africa, 1955. Contains, among others, a section by the Division of Inland Fisheries which includes articles on the fresh-water fisheries of the Cape Province, Johkershoek Hatcherye-Stellenbosch, Pirie Trout Hatchery--King William's Town, and stocking of public waters. A section on research and field surveys discusses the establishment of an eel fishery in the Cape Province and the production of fish for food under the Transket fish farming project. A report of the Provincial Inland Fisheries Officer at Cape Town is also presented.
- United States Standards for Grades of Frozen Fish Sticks (Effective August 21, 1956), 6 pp., processed. Agricultural Marketing Service, U. S. Department of Agriculture, Washington 25, D. C., July 18, 1956. Includes product description and grades of frozen fried fish sticks, recommended weights and dimensions, factors of quality, definitions and methods of analysis, tolerances for certification of officially drawn samples, and score sheet for frozen fried fish sticks. The standards are designed to serve as a convenient basis for sales, for establishing quality control programs, and for determining loan values. They will also serve as a basis for the inspection of this commodity by the Federal inspection service.
- Vitamin A9 in Indian Fresh-Water Fish-Liver Oils, by S. Balasundaram, H. R. Cama, P. R. Sundaresan, and T. N. R. Varma, article, The <u>Biochemical Journal</u>, vol. 64, no. 1, September 1956, pp. 150-154, printed. Cambridge University Press, American Branch, 32 East 57th St., New York 22, N. Y.
 - (White Fish Authority) Report of the Advisory Panel on the Improvement of Retail Fish Sales, 43 pp., illus., printed, 1s. (14U.S. cents). White Fish Authority, Tilbury House, Petty France, London, S.W. 1, England. The Panel's first report and accompanying appendices deal with the best methods of improving the appearance and selling efficiency of fishmongers' and fish friers' shops. The recommendations of this report are given in two sections. The first deals with general aspects of shop improvement, applicable to all types of fishmongers' shops. The second provides actual examples of progressive shop designs in the form of plans, drawings, and photographs. These designs illustrate the application of general principles to specific types of shop, for which three broad classifications are given.



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Fishery Leaflet 429 (<u>Refrigeration of Fish</u> - <u>Part 3</u>, "Factors to be Considered in the Freezing and Cold Storage of Fishery Products") is one of a series of leaflets on the refrigeration of fish. This leaflet is concerned with the changes which

take place during the freezing and cold storage of fish and with the packaging materials presently in use for fishery products. The effects of temperature changes, freezing rates, freezing methods, icecrystal size, and other factors on the fish meat during freezing are discussed. Changes in texture, color, and flavor of the meat of frozen and stored fishery products as related to the effects of rancidity, desiccation, storage temperature, available oxygen from the air, and presence of other pro-oxidents, etc., are treated in detail. Information on the frozen life of fishery products is



included. The commonly-used protective glazes, films, overwraps, and cartons are discussed and the relative merits of the various types of protective packaging are pointed out.

In addition to Part 3 of this series, Part 4, "Preparation, Freezing and Cold Storage of Fish, Shellfish, and Precooked Fishery Products"--Fishery Leaflet 430-has been released and free copies of both FL. 429 and FL. 430 can be obtained from the Division of Information, U. S. Fish and Wildlife Service, Washington 25, D. C.

To be released in the near future are Part 1, "Cold Storage Design and Refrigeration Equipment," Fishery Leaflet 427; Part 2, "Handling Fresh Fish," Fishery Leaflet 428; Part 5, "Distribution and Marketing of Fishery Products," Fishery Leaflet 431.

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COMMERCIAL FISHERIES REVIEW



A review of developments and news of the fishery industries prepared in the BRANCH OF COMMERCIAL FISHERIES

A. W. Anderson, Editor

J. Pileggi, Associate Editor H. M. Bearse, Assistant Editor

Mailed free to members of the fishery and allied industries. Address correspondence and requests to the: Director, Fish and Wildlife Service, U.S. Department of the Interior, Washington 25, D.C.

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The printing of this publication has been approved by the Director of the Bureau of the Budget, August 2, 1955.

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COMMERCIAL FISHERIES REVIEW

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PRELIMINARY RESULTS OF DEEP-WATER EXPLORATION FOR SHRIMP IN THE GULF OF MEXICO BY THE M/V OREGON (1950-1956)

By Harvey R. Bullis, Jr.*

INTRODUCTION

The deep-water royal-red shrimp, <u>Hymenopenaeus robustus</u>, is a bottom-dwelling species, of a size equivalent to the present commercial shrimp species of the Gulf of Mexico. Preliminary accounts of explorations for this species by the Service's exploratory fishing vessel <u>Oregon</u> have been given by Springer and

Bullis (1951 and 1954), and Springer (1954).

The first catches of royalred shrimp in the Gulf were made while the Oregon was primarily engaged in explorations for browngrooved shrimp, Penaeus aztecus. In July 1950, a series of trawling stations was made off the Mississippi Delta, in increasing depth intervals beyond the limits of the continental shelf. At that time, small numbers of royalred shrimp were taken in depths of 195 to 232 fathoms. During the following four years, which were primarily devoted to exploration for shallower-water shrimp and for tuna, a short period of each trawling cruise was spent on additional deepwater dragging. By the end of



Fig. 1 - The deep-water royal-red shrimp (Hymenopenaeus robustus).

1954, exploratory coverage of the 100- to 300-fathom range in the eastern Gulf between the Mississippi Delta and Key West, and along the Texas Coast was extensive, with limited work carried out to depths of 500 fathoms. Only scattered drags were made off Louisiana, the Campeche Banks, and in the Gulf of Campeche, where generally poor trawling bottom was encountered.

The distributional picture that emerged from this work showed royal-red shrimp to be present throughout the Gulf of Mexico on all types of bottom in a depth range of 190 to 270 fathoms, with a maximum range of 150 to 400 fathoms. *Chief. Gulf Fisheries Exploration and Gear Research, Exploratory Fishing and Gear Development Section, Branch of

Chief, Gulf Fisheries Exploration and Gear Research, Exploratory Fishing and Gear Development Section, Branch of Commercial Fisheries, U. S. Fish and Wildlife Service, Pascagoula, Miss.

In September 1952, a small amount of fishing for royal-red shrimp was carried out in the north Gulf by the M/V Antillas, owned by the Gibbs Corporation of Jacksonville, Fla., and operating in cooperation with the Fish and Wildlife Service



Fig. 2 - Hauling in the cod end of a 40-foot flat trawl after an exploratory drag in the 200-fathom depth range.

(Carlson 1953). Several drags were made off Louisiana, Mississippi, Alabama, and western Florida, in the general depth ranges suggested by prior catches of the Oregon. The best catches were approximately 70 pounds an hour along the 200-fathom curve east of the Mississippi Delta.

In 1955, with the completion of shallow-water shrimp exploration in the Gulf, a series of cruises were programmed for the <u>Oregon</u> to provide a more comprehensive picture of the commercial potentialities of royal-red shrimp. The following work plan was subsequently followed, using commercial-scale gear whenever suitable trawling conditions were found.

In March 1955, a series of 34 trawling stations were made in depths of 160 to 270 fathoms between the Mississippi Delta and Cape San Blas, Fla. In July, round-the-clock trawling was attempted in depths of 190 to 300 fathoms south and southeast of Dry Tortugas. Extensive gear damage was sustained while making 16 drags, and work was stopped ahead of schedule. Following this work, some exploration of the 200-fathom depth range was carried out on the eastern end of Nicolas Channel along the north coast of Cuba, and in the Straits of Florida off Key Largo. In

September, exploratory coverage was extended along the Louisiana Coast, where generally poor trawling bottom was encountered. During the last half of the cruise, the Delta to Cape San Blas area was reworked using 80-foot balloon trawls.

In March 1956, further commercial-fishing trials were run off the Mississippi and Alabama coasts. Six days of round-the-clock fishing were carried out through a two-week period of generally bad weather. In May, three weeks were spent trawling along the Mississippi, Louisiana, and Texas coasts. In June, simulated commercial-scale fishing was tried in the two restricted areas off Mobile and Dry



Fig. 3 - A moderate catch of mostly trash fish species in the cod-end of an 80-foot balloon trawl prior to dumping on dock,

Tortugas. These areas, based on previous results, appeared most promising for immediate exploitation. Following selection of optimum trawling depths, three days of round-the-clock fishing were carried out in each area.

To date, 308 trawling stations have been made by the Oregon between the 100-and 500-fathom curves in the Gulf of Mexico.

In the early months of 1956, a supplementary exploratory program was established on the South Atlantic Coast, to obtain information on the possible existence of deep-water shrimp resources in that area. The program has been financed with funds provided by the Saltonstall-Kennedy Act of 1954, and has operated with the chartered M/V $\underline{\text{Pelican}}$ and M/V $\underline{\text{Combat}}$. This work is currently under way, and has so far led to the discovery of promising royal-red shrimp grounds. Results will be reported in detail in the near future.

GEAR AND METHODS

Several shrimp trawl modifications have been tried with varying degrees of success in the deep-water dragging. After initial trials with other types, a 40-foot flat trawl was used for all exploratory work (for a description of this trawl see Fishery Leaflet 394, pp. 7-10). This net has worked well under almost every trawling condition. It was towed on a single trawling warp rigged with a 25-fathom bridle, using weighted 5- and 6-foot trawl doors.

In each area explored, efforts were made to complete a series of trawl drags in close depth intervals. After the general royal-red shrimp depth range had been determined, 5- to 10-fathom depth intervals were trawled between the 150- and 300-fathom curves, in several different areas. Vessel courses while trawling were determined by depth-recorder readings. In general, this practice worked very well; however, occasionally the trawl was dragged into small "dead-end" crevices along the slope, which resulted in bogging and loss of gear.

It was our general practice to survey the intended trawling area using a depth recorder prior to lowering the gear. If recorder indications showed apparently trawlable bottom, the net was lowered and the trawling warp was run out while the vessel ran ahead at 7 to 8 knots. It was necessary to maintain a slight drag with the winch brake to prevent trawling warp blacklashes. A trawl cable meter was used to determine the length of wire going out; and when all but 100 fathoms of warp had been set, the vessel was slowed to trawling speed as the remaining warp was run out.

Exploratory drags were of 1- to 3-hours duration, usually depending upon the appearance of the bottom as shown by the depth recorder.

Occasionally, erratic trawl performance in usually trawlable areas indicated strong subsurface or bottom currents. (On one occasion off Freeport, Tex., five attempts were made to get a 40-foot trawl and heavily-weighted 5-foot doors on the bottom. Up to 800 fathoms of warp were run out without making a successful drag). Optimum warp length for a given depth has been found to vary, depending on weather and current conditions. Proper wire-depth ratio is important since water-hauls and bogging the trawl doors and net are the result of too little or too much warp. An approximate ratio of wire length to depth for the 200- to 250-fathom range is the depth times 3, necessitating winch drums that can hold up to 750 fathoms of $\frac{1}{2}$ inch-diameter wire. Minor adjustments in wire length can be made on subsequent drags, as indicated by catch and trawl performance.

Numerous changes in the design and rigging of trawl doors have been tried in an effort to reduce the high incidence of bogging gear in the soft mud off the Mississippi Delta. Modifications of the "rocking chair" door, which is used in the mud lump area off the Mississippi Delta, and use of mud ropes worked well; and early attempts at "production" fishing were carried out with this rig. Further tests revealed that satisfactory trawl-door performance was obtained by increasing the thickness and width of the steel runners to $\frac{3}{4}$ " x 6" or 8", and attaching a 4-foot piece of 1" x 4" flatbar to the outside of each door immediately above the runner for additional weight and balance. Apparently, the chief cause of bogging is the "laying down" of a trawl door and the subsequent digging of the forward edge as it is dragged along the bottom. Increasing the weight of the door has an added advantage in that it also permits using shorter warp.

Widely varying weights of catches in adjacent areas have also indicated inconsistent trawl behavior. A simple meter was devised which may be calibrated to give a reading for the distance the trawl is actually working on the bottom (see fig. 4). It consists of an 8" sprocket gear on a shaft attached to a flexible arm

bolted to the runner outside of either trawl door. A bicycle cyclometer is mounted on the top of the arm and is activated by a pin set in the inner surface of the gear. The unit was calibrated on land and checked with loran fixes in test drags. Using





Fig. 4 - Two views of a prototype bottom-distance meter used to determine the actual distance a trawl works the bottom during a drag,

this instrument, it has been possible to obtain an approximate figure of the catch per unit of trawl-working distance. By plotting the readings obtained from a series of drags covering different time intervals, it has also been possible to obtain data on the length of time it takes for the gear to reach the bottom and to start fishing.

Double warps have been used, but a large majority of the drags were made using a single warp and bridle. Galvanized, 6x 7 performed, improved plow steel, hemp center, marine lubricated wire has proved to be satisfactory construction for trawl warp. Bridles are made of $\frac{3}{8}$ -inch-diameter wire, with the main warp of $\frac{1}{2}$ -inch diameter wire.

100-foot flat and 80-foot balloon trawls (also described in FL 394) have been used in "production" trials. Generally speaking, the balloon trawl gave the best performance, particularly off the Mississippi Delta, where a mud rope was needed to keep the flat trawl from bogging.

The 80-foot balloon trawl was used with 8-, 9-, and 10-foot trawl doors, heavily weighted, as were the 5- and 6-foot doors described previously. Widening the runner to 6 inches or 8 inches, shortening the top door chains by one link each, and adding 100 to 150 pounds of iron bar to each door above the runner practically eliminated the bogging problem.

Hauling back of the trawl takes from 25 to 40 minutes, depending on the depth fished. An additional 20 to 25 minutes are needed to dump the catch and re-set the gear. With this amount of fishing time lost per set, it has been found profitable to make long drags, bottom conditions permitting. Drags of 5 or more hours duration are possible since accumulation of bottom trash is moderate.

To effectively fish the deep-water shrimp grounds, the use of loran is imperative. The known fishing areas are bounded on both ends by bad trawling bottom, much of which is not detectable by depth-recording equipment. Also, occasionally small zones of temporarily high concentrations of shrimp will be found, and without the definitive positioning available with loran, it would be extremely difficult to fish them with maximum efficiency.

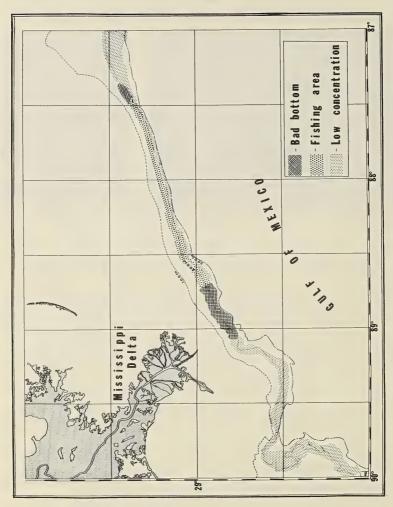


Fig. 5 - Mississippi Delta royal-red shrimp grounds showing areas of fishing concentrations and bad trawling bottom.

DESCRIPTION OF FISHING GROUNDS AND CATCH DATA FROM COMMERCIAL-SCALE TRAWLING

Royal-red shrimp catches of commercial significance have been restricted, for the most part, to two well-defined areas; off Dry Tortugas, and east of the Mississippi Delta. Although the species is widely distributed, highest catches from all

other areas in the Gulf were under 50 pounds of heads-on shrimp an hour. Between March 1955 and June 1956 six cruises were devoted to obtaining commercial-catch estimates in the two areas of promise. The following description of these areas includes a summary of the catch rates obtained.

MISSISSIPPI DELTA AREA: These grounds cover an area of approximately 300 square miles, extending from 87 30' west longitude to 88 40' west longitude between the 190- and 275-fathom curve. The bottom is cohesive blue mud with very small quantities of sand or shell fragments. The continental slope is moderately pitched, and with the exception of a few "gullies," echograph tracings show no trawling obstructions in the area. Earliest trawling attempts resulted in repeated bogging of trawl doors in the soft mud, which appears to be the principal trawling hazard of the area.

Bottom temperatures at trawling stations have been obtained with a standard reversing thermometer. Close correlation of royal-red shrimp concentrations and bottom temperatures in the Del-

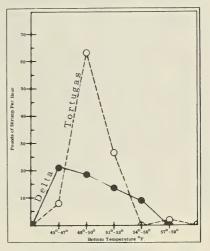


Fig. 6 - Average hourly catches in the Delta and Tortugas areas, at various bottom temperature, Includes data from all successful catches with bottom temperature records, covering all seasons, 1950-1956.

ta area has been noted. With few exceptions, royal-red shrimp appear to be confined within a temperature range of 45°-54° F., which is characteristic of the 190-to 220-fathom range both in the Delta and Tortugas grounds. Largest concentrations have been found in a range of 47° to 52° F., and highest catches have been centered in 47°-50° F. water for both areas. There is strong empirical evidence indicating that the fluctuations in depth-temperature relationships that occur along the continental slope of the northeastern Gulf of Mexico are of primary importance in determining the depth location of fishable concentrations. The shallowest royal-red shrimp record was in a depth of 150 fathoms, at a bottom temperature of 52° F. The usual temperature range at that depth varies from 54° to 58° F. On other occasions temperatures of up to 55° F, have been observed at 200 fathoms. At these times royal-red shrimp apparently move out of the area, and it has been necessary to extend fishing operations down to depths of 240 to 270 fathoms, where temperatures then range between 48°-52° F., to locate maximum concentrations.

There appears to be no seasonal correlation to these occasional depth-temperature changes, and changes in depth of shrimp concentrations. This type of offshore (deeper water) movement of shrimp has been noted in the fall of 1951, in the summer of 1953, in the spring of 1955, and in the summer of 1956. Spring and fall catches in 1950 and catches from early spring through late fall in 1952 showed no variation in optimum depth range and little temperature change.

It is probable that the imperfectly known current changes in this area, which may be brought about by a combination of wind and tidal oscillation factors, induce

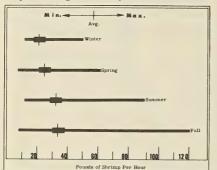


Fig. 7 - Maximum, minimum, and average catch rates for royalred shrimp in the Mississippi Delta grounds, in depths of 190 to 270 fathoms, Includes data from June 1956.

irregularly-timed shifting of water masses along the continental shelf and slope, which in turn determines the depths of maximum royal-red shrimp concentrations. It would be profitable for vessels fishing this area to carry a reversing thermometer and a small winch to determine water temperature prior to the start of fishing operations. The use of this equipment could save a considerable amount of time in locating the optimum depth for trawling at the start of a trip, and could provide a periodic check throughout the trip. Trying to locate optimum depths within the vertical range of about 80 fathoms (190 to 270 fathoms) often takes a day or more of test fishing.

Seasonal catch rates, based on 80foot trawl averages, for all successful relatively low, but show a gradual in-

drags in the 190- to 275-fathom range, are relatively low, but show a gradual increase in rate from a low of 21 pounds (heads-on) an hour in the winter to a high of

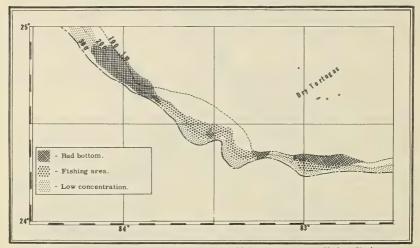


Fig. 8 - Dry Tortugas royal-red shrimp grounds showing areas of fishing concentrations and bad trawling bottom.

36 pounds (heads-on an hour during the fall. However, these averages include many drags of a purely exploratory nature made outside of the limits of highest known concentrations. The increasing catch rate from winter to fall is shown by the maximum catch rates that have been obtained. In the Delta area, highest winter catches have run approximately 50 pounds heads-on shrimp per hour of dragging. In the spring, the rates increase to 60 pounds of heads-on shrimp an hour. In the summer and fall, maximum catch rates have reached 86 and 120 pounds of heads-on shrimp an hour, respectively.

In limited production trials by the <u>Oregon</u>, high rates have not been reached on a continuing basis. Not infrequent gear failures (i.e, water-hauls, bogging, etc.), particularly during the earlier production trials, resulted in materially reducing daily catch totals. For the winter months these averaged approximately 300 pounds (heads on) a day. For the spring, summer, and fall, catches averaged 600, 700, and

900 pounds a day, respectively. With no apparent change in catch rate between day and night dragging, it is possible to complete approximately four 5-hour tows a day, with an average dragging time of 20 hours a day. Individually good catches by the Oregon indicate a potential round-the-clock catch of 1,000 pounds of heads-on shrimp a day in the winter, to a high of 2,400 pounds a day during the fall.

TORTUGAS AREA: These grounds (see fig. 8) cover an area of approximately 120 square miles, extending from 83 17' west longitude to 83 45' west longitude, between the 190- and 250-fathom curves. The distance between these curves varies from approximately 2 to 6 miles, with an average width of 4 miles. With the exception of a narrow ridge of loose limestone rock along the 212-fathom curve at 83 33.5'



Fig. 9 - Separating the royal-red shrimp from a large catch off the Mississippi Delta, Note the porportionately small amount of scrap which is characteristic in good shrimping areas,

212-fathom curve at $83^{9}33.5^{\circ}$ statasets in good similping areas. west longitude, and $24^{9}2.3^{\circ}$ north latitude (loran reading: 2H6 - 1370; 2H7 - 2955), this entire area provides excellent trawling bottom. The bottom is characterized by a light gray to gray-green calcareous mud. The mud has a fine, gritty texture, and packs hard when allowed to settle in a bucket of water.

At both ends of this area are patches of the hydrocoral, <u>Stylaster</u>, which appear to be impossible to detect on depth recorders because of its low height. Trawls dragged over these patches are invariably torn to shreds Another smaller trawling area east of the main grounds is centered between 82°40' and 83°08' west longitude between 190 and 250 fathoms.

Depth contours for the principal fishing grounds form a slight indentation into the continental shelf, which seems to afford some protection from the main current flow of the Gulf Stream. In fact, during trawling operations by the Oregon, a westerly current set of approximately 0.5 knots was observed. Here bottom temperatures have shown little variation in the royal-red shrimp range. Temperatures from April 1954 varied between 49.1° and 52.7° F. in the 190- to 250-fathom range, with an average temperature of 50.2° F. Temperatures from the same area in June 1956 varied from 48.7° to 50.5° and averaged 50.0° F.

Deep-water trawling by the <u>Oregon</u> has been carried out in the Tortugas area in April 1954 (cruise 22), July 1955 (cruise 32), and June 1956 (cruise 39). During the two earlier trips, primary emphasis was placed on delimiting the areas of good catch rates. Although promising catches were made using 40-foot trawls, little success was achieved using larger commercial-scale gear in early trials. On Cruise 22, catches ran from 10 to 120 pounds an hour, and averaged 52 pounds an

hour of heads-on shrimp. Highest catch rates were obtained between 190 and 200 fathoms. On cruise 32, extensive gear damage restricted the amount of work accomplished. Catch rates ran from 8 to 24 pounds an hour using 40-foot trawls, and averaged 13 pounds a hour. Highest catches were made in 200-220 fathoms. Com-



Fig. 10 - One of the potentially valuable byproducts of royal-red shrimp fishing is tasty deep sea red crab (<u>Geryon quinquedens</u>) which is occasionally caught in large numbers in 200 to 400 fathoms,

mercial-type dragging on cruise 39 yielded catch rates of from 50 to 196 pounds of heads-on shrimp an hour using 80-foot balloon trawls. Good fishing ranged between 210 and 220 fathoms with highest catches along 212 fathoms. A total of 3,145 pounds of 26-30 count heads-off royal-red shrimp were landed during three days of round-the-clock fishing.

DESCRIPTION OF THE CATCHES

Royal-red shrimp have shown no apparent seasonal variation in average size. In areas of maximum fishing concentrations, the heads-off count consistently averaged 26-30, in both the Tortugas and Delta areas. A larger average size is noted in greater depths, but the concentrations are much smaller. No uniform size dominates the catch, which contains individuals ranging from 12- to 50-count heads-off shrimp.

There is some color variation in royal-red shrimp. Nighttime catches are typically bright red, while catches landed during daylight hours are a light pink.

Other species of deep-water shrimp are often found mixed with royal-red shrimp. While dragging in depths of 150 to 225 fathoms, varying quantities of a smaller pink-colored shrimp, $\underline{\text{Peneopsis}}$ $\underline{\text{megalops}}$, have been caught. Average sizes of this species vary from 40 to 60 count heads on. The largest individuals reach approximately 35-count. Highest concentrations of this species in most areas are generally located 10 to 30 fathoms shallower than highest concentrations of $\underline{\text{H}}_{\bullet}$, $\underline{\text{robustus}}_{\bullet}$. Incidental catches of $\underline{\text{P}}_{\bullet}$, $\underline{\text{megalops}}_{\bullet}$ have varied from 10 to over 200 pounds a drag while fishing for royal-red shrimp with large commercial gear. This species has a good flavor and could provide a valuable supplement to royal-red shrimp catches.

Royal-red shrimp catches in the Dry Tortugas area, in addition to P. megalops, included from 1 to 45 pounds of large (21-25 count) striped shrimp, Plesion-ika longipes. This species belongs to the family Pandalidae, as do the commercial shrimp of northern Europe and of the coasts of Oregon, Washington, and Alaska.

The few drags made beyond the 300-fathom curve have produced small numbers of several other species of large peneid shrimp. Most common of these is the scarlet red <u>Plesiopenaeus edwardsianus</u>, which averages about 16-20 count. This species has extremely long swimming legs, and is probably not a bottom dweller.

Another common species throughout the Gulf in 225 fathoms is the hard-shell-ed Glyphocrangon longleyi. Occasionally, catches will contain from 50 to 100

pounds of this species. Although it reaches a fairly large size (31-40 count headson) and the meat has a good flavor, considerable work is required to crack the shell and remove the meat. The yield is proportionately small.

Table 1 - Principal Constituents of the Scrap Catch, by Numerical Strength, in the

Dry Tortugas and Mississippi Delta Royal-Red Shrimp Grounds					
Delta Grounds (85 To	ws)	Tortugas Grounds (83 7	Cows)		
	No. of Fish % of Total		No. of Fish % of Total		
A. Fish (92 percent by weight):		A. Fish (63 percent by weight):			
Macrourids	27	Merluccius magnoculus	22		
Merluccius magnoculus	26	Chaunax pictus	20		
Physis cirratus	26	Chlorophthalmus chalybieu	ıs 16		
Bembrops goboides	9	Peristedion miniatum	8		
Peristedion miniatum	3	Peristedion gracile	7		
Scorpaena sp	2	Macrourids	5		
Other species	7	Other species	22		
	No. of		No. of		
	Invertebrates		Invertebrates		
	% of Total	D T 11 1 107	% of Total		
B. Invertebrates (8 percent		B. Invertebrates (27 percent			
by weight):	0.0	by weight):	4.0		
Peneopsis megalops	82	Plesionika longipes	48		
Actinauge longicornis .	5	Munidia sp	20		
Sympagurus pictus	2	Peneopsis megalops	15		
Polycheles sp	1	Tugurium longleyi	4		
Other species	10	Other species	13		

The identification of some species is still in progress, but to date 87 shrimp or prawn species have been found in the Gulf exploratory catches. All of these could be considered edible, but only about 40 are of sufficient size to be of present

commercial value, if found in suitable concentrations.

Accumulation of scrap species has not created much of a problem on long drags. Catches of Gulf whiting (Merluccius magnoculus) frequently run from 100 to over 500 pounds a drag, but this species accounts for 25 to 75 percent of the scrap catch, and it is easily handled. The Gulf whiting averages $\frac{3}{4}$ of a pound and is very similar to the commercially-important Atlantic whiting (M. bilinearis). It may eventually prove to be a profitable byproduct. A listing of scrap species by approximate numerical strength is presented in table 1.

ROYAL-RED SHRIMP ICING TESTS

Yield, quality, and handling studies on H. robustus are now being made by the Service's Technological Seately.



Fig. 11 - Heading a catch of large royal-red shrimp that have been previously separated from the scrap species.

being made by the Service's Technological Section and will be reported on separately.

CONCLUSIONS

Two areas in the Gulf of Mexico contain sufficient quantities of deep-water royal-red shrimp to permit profitable exploitation throughout most of the year. The magnitude of this potential resource, in terms of continuing yield, is unknown. Although these two areas embrace a total area of several hundred square miles, high concentrations are not found throughout either area at any one time. Therefore, the number of vessels that could sustain profitable production is probably small in relation to the number of large shrimp vessels available for deep-water shrimping, after carrying out winch and rigging modifications.

From preliminary exploratory work along the South Atlantic Coast, it appears promising that additional and more extensive grounds will be available for royal-red shrimp exploitation. This work will be reported on in the near future.

Royal-red shrimp are a very palatable seafood, with a distinctive flavor that cannot be confused with the present commercial species. Preliminary consumer acceptance tests have been tried in selected seafood restaurants, and highly favorable comments have been received on taste, appearance, and texture.

LITERATURE CITED

Bullis, Harvey R.

1951. Gulf of Mexico Shrimp Trawl Designs, Fishery Leaflet 394, U. S. Fish & Wildlife Service, 16 pp.

Carlson, C. E.

1953. Shrimp Exploration of the M/V Antillas, Proc. Fifth Annual Session Gulf and Caribbean Fisheries Institute (November 1952), pp. 32-35.

Schroeder, Wm. C.

1955. Report on the Results of Exploratory Otter-Trawling Along the Continental Shelf and Slope Between Nova Scotia and Virginia During the Summers of 1952 and 1953, Papers in Marine Biology and Oceanography, Suppl. to vol. 3, Deep-Sea Research, pp. 358-372.

Springer, Stewart

- 1951. The Oregon's Fishery Explorations in the Gulf of Mexico, 1950 (A Preliminary Report). Commercial Fisheries Review, vol. 13, no. 4 (April 1951), pp. 1-8 (also Separate 277).
- 1955. Exploitation of Deep-Water Shrimp in the Gulf of Mexico, Proc. 7th Annual Session Gulf and Caribbean Fisheries Institute (1955), pp. 67-71.

Springer, Stewart and Bullis, Harvey R.

- 1952. Exploratory Shrimp Fishing in the Gulf of Mexico, 1950-51, Fishery Leaflet 406, U. S. Fish and Wildlife Service, 34 pp.
- 1954. Exploratory Shrimp Fishing in the Gulf of Mexico, Summary Report for 1952-54, Commercial Fisheries Review, vol. 16, no. 10 (October), pp. 1-16 (also Separate 380).



IRON SULFIDE DISCOLORATION OF TUNA CANS1/

No. 4 - Effect of Retorting and Cooling Canned Fish

By George M. Pigott* and M. E. Stansby**

ABSTRACT

Investigations were made on the effects of retorting and cooling on the formation of black ferrous sulfide discoloration in canned tuna. Free sulfide was not found in the unprocessed fish but appeared in all canned tuna after processing. The amount of free sulfide was found to increase with longer retorting periods. Free sulfide did not form a black precipitate of ferrous sulfide unless the free iron in the ferrous state was available. Discoloration occurred in the cans during the cooling period and was greater in cans held, while cooling, at elevated temper-

INTRODUCTION

Certain batches of tuna when canned cause an iron sulfide deposit to form on the can area adjacent to the headspace. The deposit is caused by a reaction between sulfide from the fish and iron in the can. This paper is the fourth in a series of six papers in which a study of the reaction between ferrous iron in tuna cans

and sulfide in tuna meat is reported (Pig-

ott and Stansby 1955).

Previous work showed that precooked tuna contains no free sulfide. Therefore, the sulfide in the canned product that is available for reacting with iron must be produced during retorting. Any discoloration formed could also be materially affected by the conditions of time and temperature under which the cans are cooled. The object of this paper is to report experimental work on the effect of retorting and cooling on the sulfide content, and subsequent discoloration, of canned tuna.

RETORTING CANNED TUNA

If the amount of discoloration in canned tuna depends on the amount of sulfide present and the amount of sulfide produced is dependent on the length of the retorting period, a slight variation in the cooking time might be the deciding factor in can discoloration. In order to investigate

2400 TOTAL (MICROGRAMS) 2000 CAN 1600 PER HEADSPACE SULFIDE CONTENT 1200 MEAT 400 RETORT TIME (HOURS) Fig. 1 - Sulfide content of can vs. retort time,

the formation of sulfide as a function of retorting time, local albacore tuna that had been in cold storage at -20 $^{\circ}$ F. for 10 months was canned and retorted at 240 $^{\circ}$ F. for various periods of time up to 6 hours. The headspace gases and meat (including liquid) in composites containing 5 cans each were then analyzed for sulfide content. The precooked fish contained no free sulfide when placed into the cans.

The sulfide content became appreciably larger in amount as the retorting time The results (fig. 1) showed that the free sulfide formed during was increased. Formerly Chemical Engineer, Continental Can Company, Seattle, Wash.

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1/ This investigation, which was carried out at the Seattle Technological Laboratory, U. S. Fish and Wildlife Service, was jointly sponsored by the Continental Can Company and the Fish and Wildlife Service,

retorting was found mostly as hydrogen sulfide gas in the headspace of the can, although significant amounts were found in the meat. Tin sulfide staining was found in cans that were processed one hour, and this staining also became larger in amount with increased retorting time. However, even though the sulfide content of the cans became far greater than that found in normal packs, no ferrous sulfide discoloration was formed in this particular batch of tuna.

The above results showed that sulfide in canned tuna is released during the retorting period (fig. 2). A series of analyses were carried out to determine the



Fig. 2 - Retorting of canned tuna.

amount of sulfide normally present in canned tuna. Analyses for sulfide were run on commercially-canned discolored packs and on experimentally-canned tuna packs. The commercially-packed discolored cans were samples from 3 packs that had been rejected for consumer distribution because of this discoloration. The amount of sulfide that was deposited on the can was determined by dissolving the deposit in hydrochloric acid and then removing hydrogen sulfide in the regular manner by aeration.

It was found that appreciable sulfide is present in both normal and discolored tuna cans. The distribution of sulfide in various packs is shown in table 1. Experimental pack 1 is from the same experiment in which the amount of sulfide formed during retorting was determined. An exploration for the hydrogen sulfide being much higher in this pack is that the fish used were from the group of local albacore that were slightly spoiled when frozen and hence the fish tissue was more easily broken down by thermal processing.

Sulfide was added to experimental packs in quantities varying from 100 micrograms to 1 gram. Even when 1 gram of sodium sulfide was added -- as shown in

	Table 1 - Distribution of Sulfide in Various Packs of Tuna									
Packs From Which the Cans Were Obtained			Sulfide Deposited on Can1/		Sulfide	Total Sulfide				
Designation of Type	f Pack Lot	Species of Tuna	Type of Pack	Amount Deposited (as H ₂ S)	Degree of Discoloration	Amount in Meat, Including Liquid	Amount in Headspace Gas	Total Amount	in Can	
Commercial	No. 1 2 3	Yellowfin Yellowfin Albacore	Flake Solid Solid	Micrograms per Can 2/ Trace 55 30	Slight Moderate Moderate	18 29 57	(Microgram 38 15 64	56 44 121	56 99 151	
Experimental	1 2 3 4 5	Albacore Albacore Yellowfin Albacore Albacore	Solid Solid Solid Solid Solid	0 0 0 0	None None None None None	66 24 15	582 104 101 -	648 128 116	648 128 116 3/106 4/106	
2/Size 307 x 113, one	The values given are the averages obtained in the examination of 48 cans or more from each pack, except for Commercial Pack No, 1 from which 12 cans were examined, Sizes 697 x 113, one-half pound tuns can. 3/Sulfde artificially added as Na ₂ S, A few drops of dilute HCl were added to insure liberation of Hys.									

table 1, experimental lots 4 and 5--iron sulfide did not form. However, when ferrous salts were suspended in water and painted on the lids used in the experimental packs, extensive deposits of ferrous sulfide formed in all experimental packs after retorting. Thus, it is the presence of ferrous iron and not the amount of sulfide that is the controlling factor in can discoloration.

COOLING CANS AFTER RETORTING

A series of experiments were carried out to determine when discoloration actually takes place in canned tuna. Albacore and yellowfin from batches of tuna that had a history of causing can discoloration were packed and retorted for 75 minutes at 240° ± 2° F. The pack, which was

allowed to cool at room temperature. was sampled at time intervals up to 24 hours. The sampled cans were opened and the area of sulfide discoloration was measured. In all cases, no discoloration was found immediately after the cans were retorted. The first specks of iron sulfide were detected after about 1 hour and continued to grow in size and number until about 10 hours after the retorting period. In all cases the maximum discoloration was reached before 24 hours after retorting. The results of this experiment are shown in figure 3.

An investigation of the effect of var ious cooling temperatures was carried out using yellowfin tuna from the above experiments. Albacore tuna that had shown no history of can discoloration was also used. Immediately after the retorting period the canned fish were

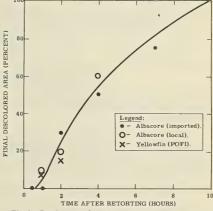


Fig. 3 - Development of can discoloration after retorting.

placed in constant-temperature oil baths ranging from 64° F. to 216° F., for a period of 21 hours. After removal from the baths, the cans were placed at room temperature storage. Upon inspection of the cans "cooled" at the various temperatures, can discoloration was found to be at a maximum after the 21-hour period. Iron sulfide discoloration was found in cans of both the yellowfin and albacore that were held at temperatures above 135° F. In all cases, can discoloration became progressively worse with increased cooling temperatures.

CONCLUSIONS

- (1) Formation of black iron sulfide in canned tuna was found to depend upon the presence of ferrous iron.
- (2) All cans of tuna contained sufficient hydrogen sulfide to give can discoloration if any exposed iron in the can was in the form.
- (3) Sulfide discoloration occurred after the cans were retorted, during the cooling period.
- (4) Sulfide discoloration in packs that commonly showed the discoloration was made much worse if the cans were allowed to remain at elevated temperatures while cooling.
- (5) The free sulfide formed during retorting was found mostly as hydrogen sulfide gas in the headspace of the can, although significant amounts were found in the meat.

Note: Also see Commercial Fisheries Review; Oct, 1955, p. 33, for "Background" and "No. 1 - Theory of Iron Sulfide Formation in Cans;" Feb, 1956, p. 5, for "No. 2 - Analytical Methods;" June 1956, p. 8, for "No. 3 - Effect of Variables Introduced by the Fish."

LITERATURE CITED

Pigott, George M., and Stansby, Maurice E.

1955. Iron Sulfide Discoloration of Tuna Cans. No. 1 - Theory of Iron Sulfide Formation in Cans. Commercial Fisheries Review, vol. 17, No. 10, pp. 34-39. (Also Separate No. 418.)

1956a, Iron Sulfide Discoloration of Tuna Cans. No. 2 - Analytical Methods. Commercial Fisheries Review, vol. 18, no. 2, pp. 5-9. (Also Separate No. 429.)

1956b, Iron Sulfide Discoloration of Tuna Cans. No. 3 - Effect of Variables Introduced by the Fish. Commercial Fisheries Review, vol. 18, no. 6, pp. 8-12. (Also Separate No. 439.)



NORTHERN LOBSTERS ADJUST THEMSELVES TO CHANGING WATER TEMPERATURE

It was found during experiments conducted by scientists of the Fisheries Research Board of Canada that lobsters do have limited ability to adjust themselves to changing water temperatures.

If the salt and the dissolved oxygen content of the water are favorable, the lobsters can be held alive for several days at high temperatures. Those lobsters acclimated to cold water $(40^{\circ}\ {\rm F.}),$ can live in water as warm as $75^{\circ}\ {\rm F.};$ those used to $80^{\circ}\ {\rm F.}$ water can live in 90 $^{\circ}\ {\rm F.}$ water. But they can be killed by a sudden lowering of the water temperature. Thus, lobsters held at as low a temperature as $60^{\circ}\ {\rm F.}$ died when placed in water of $40^{\circ}\ {\rm F.}$

The results of these experiments have been of great value to commercial interests who are continually faced with the problem of holding lobsters alive for shipment to markets.

In the waters where the lobster (<u>Homarus americanus</u>) is found, the temperature range is about 45° F., from 30° F. in winter to 75° F. in certain areas during the summer months.

--Sea Secrets, The Marine Laboratory, University of Miami, Coral Gables, Fla.

PILOT-PLANT FISH-MEAL DRYER

By Lynne G. McKee* and Neva L. Karrick**

PREFATORY ABSTRACT

This article reports on the design and method of construction of an experimental fishmeal dryer. The device is compact, portable, and makes possible close control of the various processing variables. From 2.5 to 10 pounds of meal can be prepared in the dryer at one time. It has been found satisfactory for processing both tuna viscera and whole herring,

INTRODUCTION

The development of laboratory methods to determine the relative nutritional quality of fish meals is one of the important projects in the Service's Branch of Commercial Fisheries. Before such methods can be developed, however, the factors causing the differences in quality must be known. Knowledge of these factors

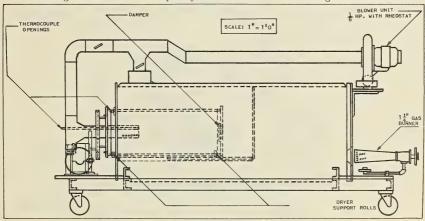


Fig. 1 - Side view of dryer housing.

then can be applied to setting up methods to determine the differences in a quantitative manner and, ultimately, to solving the problem of producing fish meal of uniform quality.

In order that the processing variables that affect the nutritive value of fish meal could be studied, a pilot plant-scale fish-meal dryer was designed and constructed. This dryer was designed in such a manner that the operator would have complete knowledge of the conditions inside of the dryer during different steps of the drying process and would be able to control these conditions. Runs thus could be repeated exactly, and variables could be introduced and controlled exactly.

For convenience and for use in limited space, the meal dryer had to be compact and portable. It had to be a complete unit, with gas and electrical connections being the only separate components needed; and it had to be large enough to hold the amount of raw material necessary to produce $2\frac{1}{2}$ to 10 pounds of meal, which is about the amount that ordinarily is needed to check the nutritional value of the meal by chemical and biological tests.

DESCRIPTION OF PILOT-PLANT FISH-MEAL DRYER

The essential parts of the fish-meal dryer are as follows: (1) a rotating inner drum with parallel flights (vanes) to distribute and tumble the meal while it is drying; (2) a stationary drum or housing to confine and direct the hot gasses around the rotating drum; (3) a nozzle-type gas-burner heat source; and (4) accessories-

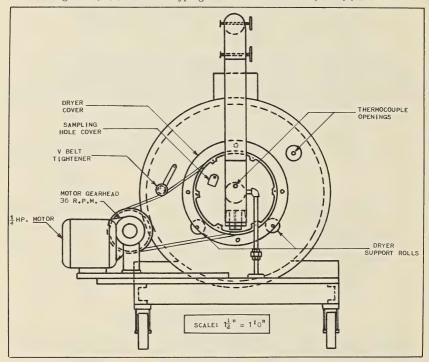


Fig. 2 - Front view of dryer housing,

drum motor, exhaust fan, thermocouples, and air ducts. Because the exact conditions used to dry the meal must be known, it was necessary to have knowledge and control of (1) the gas-air combination needed to obtain particular heating conditions, (2) the temperatures in the jacket and in the drum, (3) the regulation of the draft, and (4) the speed of rotation of the drum.

The housing of the dryer (fig. 1) was rolled from 10-gauge black sheet steel into a cylinder 24 inches in diameter and 60 inches in length. The rotating drum (the inner cylinder) was rolled from the same material and was 12 inches in diameter and 30 inches in length. All end plates and baffles were cut from the 10-gauge black sheet steel. (A lighter gauge would warp under the heat, and the inner cylinder would be distorted sufficiently to interfere with rotation; a heavier gauge would be harder to work and would make the assembly unduly heavy.) The circular disks used for end plates were cut 2 inches larger in diameter than were the respective

cylinder diameters in order to make it possible to attach the end plates to the cylinders with lugs and stove bolts. On the smaller cylinder, an iron ring made from 1-inch by 1-inch by $\frac{1}{8}$ -inch angle iron was pressed over the ends of the cylinder, and the end plates were secured to these rings. Angle-iron lugs were welded, at intervals, to the edge of the large cylinder, and the end plates were bolted to the lugs.

The assembly (fig. 2) was mounted upon a 3-inch channel-iron frame, which was 24 inches by 84 inches and was fitted with 4-inch rubber-tired casters at the corners. The 24-inch cylinder was mounted on saddle blocks cut from 3-inch

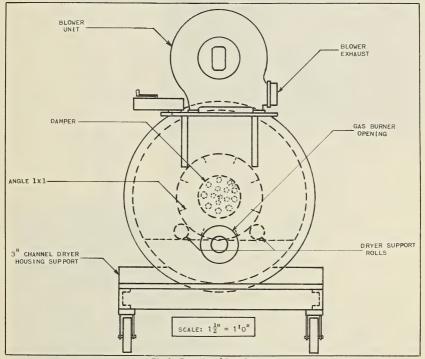


Fig. 3 - Rear view of dryer housing.

channel iron and was placed across each end of the channel-iron frame. Blocks of 85-percent magnesia were used to insulate the sides and rear of the dryer. (The front end plate was not insulated because the free space on it was too limited for the use of insulation to be practical.) The insulating blocks were covered with cotton duck in the usual manner, and the entire assembly was painted with heat-resistant aluminum paint.

The front end of the rotating drum was supported by two rollers attached to the front end plate of the housing of the dryer. The rear end of the rotating drum was

supported by two rollers on the interior of the housing (fig. 3) and was attached to an angle-iron frame welded to the inner surface of the housing. Lubrication was supplied to the rear rollers by means of two $\frac{1}{4}$ -inch copper tubes extending through the front housing.

A 12-inch V-pulley was attached to the front cover plate to drive the rotating drum. In order that the middle area of the cover could be left free for other attachments, the hub and spokes of the V-pulley were cut away, and only short lugs

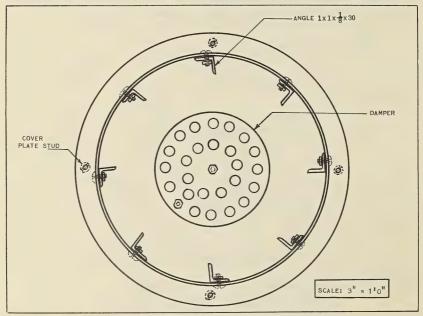


Fig. 4 - Front view of rotary drum.

were left at the rim (fig. 2 and 5). These lugs were drilled, and stove bolts were passed through the resulting holes to bolt the pulley to the cover. Pipe nipples $\frac{1}{4}$ inch by 2 inches were slipped over the stove bolts to hold the pulley away from the cover (fig. 7) and to minimize the conduction of heat to the V-belt. A $\frac{1}{4}$ -horsepower gear-head motor having a take-off speed of 36 revolutions per minute was used to provide power for rotating the drum at a speed of 12 revolutions per minute. An adjustable tightener was used to take up the slack in the V-belt.

The cover plate was attached to the rotating drum by means of four $\frac{1}{4}$ -inch studs spaced equidistant around the periphery of the drum. Wing nuts were used on the studs to permit the cover plate to be removed quickly. Parallel flights were attached to the inner surface of the drum (fig. 4) to distribute the meal while it is drying. These flights consist of 8 angle-iron sections that are $\frac{1}{4}$ inch by 1 inch by 1 inch and that are 30 inches in length. The flights were bolted to the under surface of the drum, parallel to its longer axis. The dryer was constructed level so that the meal will not gravitate to one end of the drum when it is rotating.

A damper that is 6 inches in diameter was placed on the rear end plate of the rotating drum to provide for the circulation of air through the drum. Holes $\frac{1}{2}$ inch in diameter were drilled through the damper and the end plate to provide entrance

for hot gases to the drum. The circulation of air can be adjusted by the damper. The drying process thus can be made wholly indirect or can be made semiindirect.

A motor-driven fan blower was mounted on the top of the rear end of the housing (fig. 3) to insure a draft through the dryer. A 3-inch stovepipe duct was connected to the exhaust side of the fan and was vented through a hole in a window to the outside air (fig. 6). Another 3-inch stovepipe duct was connected from the intake side of the fan to the forward end of the housing, where it entered a 3-inch tee connected with the interior of the housing. The duct to the rotating drum



Fig. 5 - General view of laboratory-scale flame dryer. Note the motor and the drive mechanism for rotating the inner meal-containing cylinder and note also the exhaust pipes and the blower at the top. The dial-type instrument records, by means of thermocouples, the temperatures obtained within the dryer.

was led downward and into the front end of the drum through the center of the removable cover. Dampers were placed in each branch of the duct to provide inde-

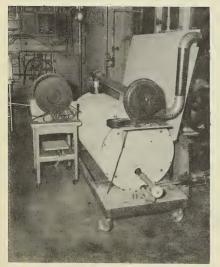


Fig. 6 - Rear view of the laboratory-scale flame dryer. Note the gas burner (near the bottom) and the blower for the discharge of gases at the top of the dryer.

pendent control of the draft through the drum and the housing. The air ducts were made easily detachable. $A\frac{3}{8}$ inch pipe support was attached to the horizontal duct entering the drum in order to prevent the vibration of the drum from shaking the air duct loose from the elbow or from the tee. A union at the lower end of the support was adjusted finger tight in order that it could be detached quickly. The horizontal duct was projected into the rotating drum about 6 inches, and the end of the vertical duct was closed with a wooden plug. A series of $\frac{1}{2}$ -inch holes were drilled in the lower side of the portion of the horizontal duct projecting into the rotary drum in order that the fines falling downward would not accumulate in the end of the duct. During the drying process, moisture condenses within the vertical riser of the exposed air duct. A small hole therefore was provided in the plug closing the 3-inch tee to allow this condensed moisture to escape.

A $1\frac{1}{4}$ -inch gas burner with a $\frac{3}{4}$ inch inlet to the city gas main was used for the source of heat. An indexed dial

was mounted on the stem of the needle valve of the burner to enable the valve settings to be repeated for replicate runs. The rheostat on the fan blower and the handles of

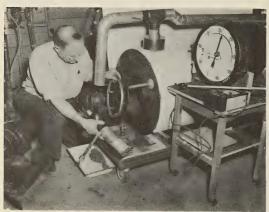


Fig. 7 - Opening the dryer preliminary to removal of the meal.

the dampers also were indexed to allow reproducible control for replicate runs. One thermocouple was inserted into the housing space of the dryer, adjacent to the rotating drum, through a $\frac{1}{2}$ -inch by 4-inch pipe nipple in the front end plate. A second thermocouple was inserted into the rotating drum itself by means of a $\frac{1}{2}$ -inch tube that passes through the horizontal duct and enters the center of the drum.

The completed dryer is shown in figures 5 and 6. Figure 5 shows the front of the dryer, with the thermocouples, the air ducts to the rotating drum and jacket, the V-belt connection to rotate the drum, and the front cov-

er. Figure 6 shows the rear of the dryer, with the gas burner, the fan blower, and the exhaust.

OPERATION OF THE DRYER

The dryer is operated as follows:

- 1. Preheat the dryer until the temperature of the combustion space is about 280° F.
- 2. Remove the air duct from the rotating drum by loosening the finger-tight union and pulling the duct free from the upper elbow.
 - 3. Slacken the V-belt tightener and run the V-belt off the pulley.
- 4. Remove the four wing nuts from the studs and take off the cover (fig. 7).
- $5\,.\,$ Distribute pulverized press cake evenly along the bottom of the drum by means of a scoop.
- 6. Reassemble the cover and ducts, insert the thermocouples, and start rotating the drum.
- 7. Since the cold press cake will cause the temperature of the dryer to drop sharply, advance the setting of the gas flame to compensate for this drop.
- 8. When the dryer is at the correct temperature, which will be reached after about 10 minutes of operation, decrease the flame gradually to the point where an even temperature is maintained as the moisture is evaporated from the press cake.
- 9. As the press cake dries, cut the flame down gradually to prevent the resulting meal from being scorched. By the end of the run, the burner should be almost closed.

If the speed of the fan is too high, meal fines will be drawn into the horizontal duct and will settle in the lower end of the tee above the plug on the vertical riser of the air duct. Upon the completion of the run, this meal can be recovered by removing the plug at the bottom of the tee. The fan motor whould be run at a speed that will maintain a great enough draft for efficient drying but that will not result in the collection of an excessive amount of fines from the rotating drum.

This pilot-plant fish-meal dryer has been operated satisfactorily both with tuna viscera and with whole herring as the raw material. Minor adjustments in operational details are necessary when the raw material is changed. When a precooked material of a light density or small particle size is used, for example, the velocity of the air in the exhaust system must be modified in order to insure that fines are not carried out of the inner drum. The meal does not stick to the side of the drum, indicating that there is adequate tumbling action. The temperature can be varied, and that selected can be maintained closely. In initial tests, $2\frac{1}{2}$ - to 10-pound batches of meal were dried in 1 to 2 hours at a jacket temperature of 225 to 300 F.

ACKNOWLEDGMENT

The authors gratefully acknowledge the aid of Richard W. Nelson, who drew figures 1 to 4.



SEA GETTING WARMER

During the last two or three decades an increase in the temperature of the surface waters of the Atlantic Ocean has been demonstrated. At the sources of the Gulf Stream this rise is less than one degree Centigrade, but further north two-degree increases have been recorded. This rise is not confined to the surface waters entirely, but may extend down to depths of over 100 fathoms.

The warmer temperatures in recent years have decreased the area covered by floating ice in the Arctic, and the thickness of this ice is now reduced some 40 percent. This is important to navigation in opening up new areas and increasing the period of time that vessels may operate in the northern waters.

Owing to this rise in water temperatures the fisheries of the north have also benefited. Extensive banks, formerly too cold, have been made habitable for several species of fishes. Notable among these is cod, which has extended itself in the waters of Iceland and Greenland, and the catch of cod from these waters has increased during this period of higher temperature. Much of this increased production reaches our own tables in the form of frozen fish sticks made from frozen fillet blocks and as frozen fillets.

--<u>Sea Secrets</u>, The Marine Laboratory, University of Miami, Coral Gables, Fla.



VARIATION IN PROXIMATE COMPOSITION OF RIGHT AND LEFT FILLETS OF ROCKFISH (SEBASTODES PINNIGER) AND DOVER SOLE (MICROSTOMUS PACIFICUS)

ABSTRACT

Individual proximate analyses were made on right and left fillets of 10 rockfish and 10 dover sole. No significant differences were found in the moisture, oil, and protein composition of the right and the left fillets from these 20 individual fish.

BACKGROUND

A sample for studies on proximate composition usually is prepared from the entire edible portion of a fish. This procedure insures a representative sample of that fish. Such samples, however, are expensive. If the same results could be obtained with one fillet, the cost of the sample, of course, would be cut in half. If the

> whole fish was bought, the second fillet could be used

for other studies.



Fig. 1 - Titration for nitrogen determination.

Paired fillets often are used in technological studies, such as freezing, storage, and taste tests. If the fillets are known to be identical--especially in oil content-greater reliance can be placed upon the results. Studies on differences between the paired fillets -- or the lack of differences -- are being conducted over a period of time. Thus the Oregon Seafoods Laboratory, under an arrangement with the U. S. Fish and Wildlife Service, has analyzed paired fillets of two species to obtain the results reported in this paper.

SAMPLES AND PROCEDURE

The species of fish used in these tests were rockfish and dover sole. The rockfish were chosen as an example of a symmetrical fish of low-oil content, whereas the dover sole were chosen as an example of an unsymmetrical fish of low-oil content. The particular fish used in these tests were caught off the coast of Oregon

and were landed at Astoria in a strictly fresh condition. Ten fish of each species were filleted. The individual fillets were analyzed for their moisture, oil, and protein contents by procedures described by the American Association of Official Agricultural Chemists (1950).

RESULTS AND DISCUSSION

Results on the right and the left fillets of the rockfish are reported in table 1. Results on the right and left fillets of the dover sole are re-



Fig. 2 - Weighing fish samples for the determination of moisture.

ported in table 2. The right fillet of dover sole is the top or dark side; the left fillet is the bottom or light side.

The composition of the rockfish fillets was typical of a non-oily fish. Averages of the moisture, oil, and protein values were the same for both the right and the left fillets of the fish.

Table	Table 1 - Proximate Composition of Right and Left Fillets of 10 Rockfish (Sebastodes pinniger)										
Data on Whole Fish Proximate Composition of Right & Left Fillets											
Fish				Mois	ture	Oi	.1	Prote	ein		
Sample	Length	Weight	Sex	Right	Left	Right	Left	Right	Left		
No.	Mm.	Gm.				. (Pero	ent)				
1	502	1951	F	79.3	79.4	1.28	1.24	19.1	19.0		
2	513	1909	F	79.2	79.2	0.94	0.94	18.7	18.8		
3	519	2050	F	79.7	79.6	1.05	1.10	18.6	16.6		
4	527	2014	F	78.9	78.8	1.10	0.92	19.3	19.0		
5	472	1519	M	78.6	78.5	1.34	1.35	19.3	19.5		
6	475	1728	M	78.2	78.4	1.72	1.83	19.4	19.2		
7	509	1965	M	79.1	79.3	1.04	0.93	18.8	18.7		
8	512	1779	M	79.9	79.7	0.88	0.90	18.3	18.2		
9	531	2073	M	79.5	79.7	1.00	0.95	18.5	18.5		
10	541	2270	M	80.9	80.8	0.60	0.65	17.8	17.8		
Avg.	510	1926	-	79.3	79.3	1.10	1.09	18.8	18.7		

The dover sole fillets had high moisture, low oil, and low protein contents. Samples 3 and 10 should be noted because they had a "jellied" condition similar to that described by Templeman and Andrews (1956) for the American plaice (Hippoglossoides platessoides Fabricus). Fish in this condition are not marketable, and fishermen attempt to avoid areas where they are found. Sample 3 is unusual in that it contained 90 percent moisture and only 8.6 percent protein.

In none of these fish were differences of a magnitude to interfere with results of experiments using paired fillets. Statistical analyses of the differences between

Table	Table 2 - Proximate Composition of Right and Left Fillets of 10 Dover (Microstomus pacificus)											
Data on Whole Fish Proximate Composition of Right & Left Fillets												
Fish				Mois	ture	0:	il	Prot	ein			
Sample	Length	Weight	Sex	Right	Left	Right	Left	Right	Left			
No.	Mm.	Gm.				. (Perc	ent)					
1	339	362	F	82.1	82.5	0.95	0.87	16.4	15.9			
2	430	759	F	82.9	83.0	0.69	0.65	15.7	15.4			
3 1/	458	808	F	89.4	90.5	0.34	0.31	8.9	8.3			
4	478	1107	F	83.5	84.4	0.73	0.64	14.3	14.0			
5	488	1025	F	82.5	83.7	0.60	0.59	15.5	14.8			
6	355	408	M	83.6	83.5	0.74	0.68	14.8	15.0			
7	385	543	M	85.0	85.3	0.68	0.57	13.5	13.3			
8	413	686	M	84.9	83.8	0.71	0.79	13.5	14.0			
9	415	714	M	84.1	84.2	0.57	0.52	14.4	14.6			
10 1/	438	784	M	84.5	84.8	0.54	0.63	13.6	12.8			
Avg.	420	720	-	84.3	84.6	0.66	0.63	14.1	13.8			
1/These fis	h had a "jell	ied" condition	that m	ade them uns	uitable for	marketing,						

right and left fillets of both species showed what visual observation of the results indicated—that no significant differences in moisture, oil, or protein existed between the right and the left fillets of either species.

LITERATURE CITED

Association of Official Agriculture Chemists

1950. Official Methods of Analysis. Seventh edition, Association of Official Agricultural Chemists, P. O. Box 540, Benjamin Franklin Station, Washington 4, D. C., pp. 296-297; 346.

Templeman, Wilfred, and Andrews, Gertrude L.

1956. Jellied Condition in the American Plaice Hippoglossoides platessoides (Fabricus). Journal of the Fisheries Research Board of Canada, vol. 13, no. 2, March, pp. 147-182.

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FISH COMPOSITION STUDIES

There are approximately 200 species of fish and 40 species of shellfish taken for food and appearing on the United States dinner tables. These fish vary in protein, fat, or ash content, but all have a low level of carbohydrate content. Modern diets based on balanced nutritive values as well as appetite appeal, require knowledge of the chemical composition of the foods involved. Diets containing fish are no exception, and to attain this knowledge the U. S. Fish and Wildlife Service has instituted a continuing study of the protein, fat, mineral, and vitamin content of all species of fish taken for food. The relative amounts of these various components may vary with the species of subspecies, geographical area of capture, sex, season of the year and, to some extent, with the individual fish. The data serve also as a means of determining the probable frozen storage life of the processed fish, commercial yield after processing, and probable potential value of the waste products. The fat content, particularly, is of the utmost importance in determining storage life.

For these studies samples of the different species of fish are being obtained by the Service's several technological laboratories from Service exploratory fishing

vessels and from local fishing vessels and fish processors. Replicate samples of each species are being collected at various times of the year in order to detect any seasonal variations that might occur in composition of the fish.

A typical fish under study is the ocean perch (Sebastes marinus) being studied at the Service's Boston Fishery Technological Laboratory. Though this fish became commercially important 22 years ago, there exists today very little information on the proximate composition and especially seasonal variations in its composition. Samples of the ocean perch have been collected periodically since February 1956. The physical analysis was performed by removing the fillets



Fig. 1 - Chemist determining the protein content of fishery products.

from each fish and then skinning the fillets. The average skinless fillet yield has been 27.7 percent, thus leaving an offal yield of 72.3 percent. The average proximate chemical analysis of the skinless fish fillets is: water, 79.6 percent; protein, 18.1 percent; fat, 1.7 percent; and ash, 1.1 percent. The average analysis of the offal is: water, 70.5 percent; protein, 16.1 percent; fat, 7.1 percent; and minerals, 6.3 percent. So far, insufficient data have been obtained for the ocean perch to determine the effect of seasonal variations on composition of these fish.

Such data are necessary to determine the protein, carbohydrate, and fat content of diets. The data show that ocean perch fillets have, at least during certain seasons of the year, a relatively low fat content. In common with other fish products, ocean perch fillets contain practically no carbohydrate or sugar components.



ANTIBIOTICS FOR FISHERY PRODUCTS PRESERVATION

STATUS OF USE IN THE U.S.: The recent series of news items about the use of antibiotics to extend the storage life of food items, including fish protected by refrigeration, has caused considerable confusion in the fishing industry over the present status of the use of antibiotics in fishery products.

The use of such materials as antibiotics in food handling and processing is subject to approval by the U.S. Food and Drug Administration. Winton B. Rankin of that agency recently made this statement on the present status of the use of antibiotics in foods from the standpoint of the Federal Food. Drug and Cosmetic Act:

1. They may be used so that no residues remain in the food. This is acceptable.

- 2. They may be used so that residues remain in the uncooked food provided:
 - a. The food is always cooked;
 - b. The cooking destroys the antibiotics;
 - c. The official tolerance has been established under the Food, Drug, and Cosmetic Act for the residue that remains in the uncooked food;
 - d. The residue is within this tolerance.
- 3. Antibiotics have been proposed for uses that will leave some of the chemical in the food as it is eaten. Their safety under these conditions has not been established. They should not be used in this way until we know more about the effect of the residues on man and micro-organisms.

The U.S. Food and Drug Administration has not approved the use of antibiotics in fish and fishery products. The conditions spelled out above have not been fulfilled for any fishery product. Any such products found to contain antibiotics before an appropriate tolerance has been established will be subject to seizures by that Agency.

The Canadian Food and Drug Administration has given approval for theuse of certain antibiotics for fish preservation under carefully defined and controlled circumstances. However, fish or fishery products from that source or any other that are found to contain antibiotics, if detected while in import status, will be refused entry into the United States or, if already in the United States, will be subject to seizure by the U.S. Food and Drug Administration in conformity with the applicable legislation.



TECHNICAL NOTE NO. 35 - IMPROVED WORKMEN'S STAND FOR PROCESSING PLANTS



Fig. 1 - Lift-up standing grate. Note the bearing, at the lower left-hand side of the photograph, on which the grate rotates. Note also the support, in the center of the grate, to keep the grate from springing.



Fig. 2 - Placing grate in working position. Note the wooden stop on the left-hand wall.



Fig. 3 - Grate in use. The top of the grate is protected by slip-proof paint.

This is a photographic report showing the details of construction and the method of employing a lift-up standing grate, which has proved both convenient to use and easy to clean. The grate was designed and constructed by Anton Stanovich of San Pedro, Calif.

ACKNOWLEDGMENT

The author acknowledges the aid of Jack A. Stanovich and Martin Stanovich of the Pioneer Fisheries in San Pedro.

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FEDERAL AID FUNDS USED TO INCREASE SPORT FISHING OPPORTUNITIES

If a fishing lake does not exist, make one. If a fishing site exists, make it available to the public. If the lake is there and if it is accessible to the public but it needs improvement, develop it.

In the course of putting these simple rules into effect, the various states spent more than \$1,000,000 on Federal Aid land acquisitions for fishing purposes in the year ending June 30, 1956, Secretary of the Interior Fred A. Seaton announced October 14, 1956. Of this amount, \$790,000 was Federal Aid funds.

During the year, approval was given 17 states for the construction of 31 lakes having a total of 2,500 surface acres, and to 20 states for the acquisition of 6,358 acres of land and the leasing of an additional 56,846 acres for fishing and access to fishing areas.

Federal Aid funds for the restoration of fish are obtained through a 10-percent tax on certain sport fishing equipment.

In addition to Federal Aid projects, the various states make or develop other fishing areas or provide access to existing fishing spots using only state funds or money raised by civic-minded individuals or groups.

In providing access to fishing areas, state fish and game departments must meet the peculiarities of their own state water and trespass laws, considering such things as the navigability of the stream or lake. In many instances the public is entitled to proceed up and down a streambed, either wading or afloat. Here the problem may be only access to the edge of the stream. In other places and under certain conditions, wading or floating is not practical or legal and the right to use the stream or bank must be acquired. The same general principles apply to lakes.



Antibiotics in Food Industry Discussed at Symposium

The Fourth Annual Symposium on Antibiotics sponsored by the U.S. Department of Health, Education, and Welfare was held in Washington, D. C., on October 17, 18, and 19. While the principal emphasis in 136 papers was on the medical aspects of antibiotics in general, 18 papers were presented by representatives from antibiotics manufacturers, universities, government agencies, and others covering present and potential applications of certain antibiotics in extending fresh food storage life. Pertinent points of the food papers are as follows:

Aureomycin and terramycin apparently have the widest range of usefulness of any of the antibiotics in the food industry because of their effectiveness in inhibiting the growth of bacteria. Indications are that they are relatively nontoxic, and are destroyed in the usual cooking procedures such as boiling, frying, or baking.

Aureomycin (chlortetracycline) is now being used commercially to extend the refrigerated life of fresh poultry. The U.S. Food and Drug Administration has established a maximum tolerance of 7 p.p.m. for residues of aureomycin in or on uncooked poultry. Terramycin (oxytetracycline) has been released also for use in poultry under the same conditions. Commercial usage is controlled by the antibiotic supplier under a franchise program which demands high sanitary standards on the part of the food processor before the antibiotic is supplied.

Reports also indicate potential application of the antibiotics in extending the shelf life of other refrigerated foods, such as fresh and cured meats, fish, and shellfish. The method of applying the antibiotic is by dip, spray, ice, animal injections, or infusion of the carcass. However, at the present time the Food and Drug Administration has not sanctioned any commercial application to food items other than poultry. Also, it was stressed that the use of antibiotics is not a panacea. The antibiotics under consideration exert their effects only on bacterial populations. They do not control the growth of yeasts or molds nor do they prevent non-microbial changes in foods such as those produced by enzymes, oxidation, etc.

Since these antibiotics are destroyed by heat and also disappear during continued storage, they have no direct value in the permanent preservation of food. In cases of unavoidable delay between the harvest of food and its preservation by canning or freezing, the use of such antibiotics might prevent undesirable changes in the food during a reasonable period of time.



Cans--Shipments for Fishery Products, January-August 1956



Total shipments of metal cans during January-August amounted to 77,154 short tons of steel (based on the amount of steel consumed in the manufacture of cans) as compared with 67,214 tons in the same period of 1955. The month of August generally marks the peak month of the packing season for many fishery products. The packs of tuna, Maine sardines, and salmon in 1956 will all exceed the 1955 packs.

Note: Statistics cover all commercial and captive plants known to be producing metal cans. Reported in base boxes of steel consumed in the manufacture of cans, the data for fishery products are converted to tons by using the factor: 23,0 base boxes of steel equal one short ton of steel. $\wedge \wedge \wedge \wedge \wedge \wedge \wedge$

California

ALBACORE TUNA TAGGED OFF SOUTHERN CALIFORNIA (M/V Nautilus Cruise 56-N-2): A total of 360 albacore and 9 bluefin tuna were tagged during a cruise (M/V Nautilus' cruise 2) from August 14 to September 6, 1956, by Cali-

Gruise (M) (Natitus Cruise 2/11 fornia Department of Fish and Game biologists. The objectives of the cruise where to tag albacore with type G "spagetti" tags as part of a study of migrations and growth; to determine the relationship between tag color and tag recovery; and to make physical and biological observations related to the occurrence of albacore. The tags were colored red, white, and blue and approximately an equal number of each color was used.

Three albacore and one bluefin tuna were subsequently recovered as follows: one albacore recovered six days after tagging, about 27 miles E. by S. of the release location; the second 41 days after tagging, about 116 miles NNW. of the releasing point; and



Fig. 1 - Albacore tagging M/V Nautilus cruise 56-N-2 (Aug. 14-Sept. 6, 1956).

the third soon after tagging at the point of release. The bluefin tuna was recovered 25 days later, 17 miles SW. of the releasing location.

The areas fished had surface water temperatures ranging between 58.3° F. and 68.2° F. Examinations of all untagged albacore revealed different types of food for the various fishing areas. Fish from the Santa Cruz Basin were feeding heavily on squid and those from the Outer Santa Barbara Channel and the northern area had been feeding on sauries (Cololabis saira). A large percentage of the albacore examined had empty stomachs.

In addition to the albacore and bluefin tuna, specimens of rockfishes (Sebastodes) were taken at Osborne Banks, San Clemente Island, and Santa Barbara Island, and sauries were commonly found under the night light in all offshore areas.

* * * * *

ABUNDANCE SURVEY OF SARDINES, JACK AND PACIFIC MACKEREL, AND ANCHOVIES CONTINUED BY M/V "SCOFIELD" (Cruise 5): The second of five cruises along the Baja California coast from Turtle Bay to the Mexican border for the purpose of assessing the relative abundance of Pacific sardines, Pacific mackerel, jack mackerel, and anchovies was made by California's Department of Fish and Game research vessel N. B. Scofield. The cruise began on August 24 and ended on September 13, 1956.

During the cruise 78 light stations were occupied. Pacific sardines were sampled at 14 stations, Pacific mackerel at 19, jack mackerel at 12, and anchovies at 11.

The vessel traveled a total of 490 fish-scouting miles--196 schools were observed visually, of which 17 were Pacific sardines, 81 Pacific mackerel, 32 anchovies, and 66 were unknown. Hydrographic data was collected at all night-light stations.



M/V Scofield Cruise 5 (Aug. 24-Sept. 13, 1956).

toward the positive electrode. Secondly, if the current is pulsed or repeatedly interrupted, each pulse will cause the muscles of the fish to contract involuntarily.

These muscle contractions propel the fish through the water toward the positive electrode where they can be easily picked up or directed into some appropriate catching devide. As long as the current is on, the movement of the fish is beyond his control—he cannot escape. It is of interest that the attracting power of a current is inversely proportional to the size of the fish and a given current will more readily attract a large fish than it will a small one.

Electro-fishing has been used with great success in stream survey work by the Department's Inland Fisheries Branch as well as by other fresh water agencies. Unfortunately, the problems of handling electric current in the ocean are enormously more difficult than infresh water.

Surface temperatures encountered on the cruise ranged from 13.55° C. (56.4° F.) at Pta. San Jose, to 23.45° C. (74.2° F.) in Turtle Bay. Fish were sampled in the following temperature ranges: Pacific sardine 14.91° C (58.8° F.) to 23.45° C. (74.2° F.), Pacific mackerel 14.00° C. (57.2° F.) to 22.02° C. (71.6° F.), jack mackerel 15.27° C. (59.5° F.) to 20.60° C. (69.1° F.), and anchovies 13.80° C. (56.8° F.) to 23.45° C. (74.2° F.).

* * * * *

NEW TECHNIQUES IN OCEAN ELECTRO-FISHING DEVELOPED: A preliminary series of experiments in electro-fishing devices and methods with a view of developing new techniques for sampling populations of marine fish have been completed by the Marine Fisheries Branch of the California Department of Fish and Game, points out the Department's September 1956 issue of Outdoor California.

Many years ago it was demonstrated that a direct current passed through the water between two electrodes will bring about some startling reactions in fish caught swimming between the electrodes. First of all, if the current is sufficiently strong, the fish will line up along the path of the current with their heads pointing



A "trouser leg" electrode. The fish are attracted to the wire mesh when the current is turned on, Once the fish are in, the webbing at the bottom is pulled up preventing their escape, In the hhoto, a portion of the Pacific mackerel and anchovies were attracted with such force that they became solidly wedged into the wire mesh of the electrode,

Because of the very high conductivity of salt water, almost a direct short circuit is produced, and the current would rather travel in all directions through the water than it would through the fish. This necessitates the use of extremely high amounts of current in order to affect the fish. However, the problem is being tackled independently in many countries of the world and it is only a matter of time before an economical and effective type of equipment is developed.

Since the Department's survey programs need only small samples of fish rather than commercial quantities, the emphasis of the experimental work has been toward obtaining the most efficient types of current and pulses with the limited power available on research vessels. At the same time, various types of electrodes which incorporate catching devices have been built and tested at sea.

Thus far the results have been most encouraging. We have been able to attract and capture small fish from distances in excess of 20 feet. It is reasonable to assume that continued experiments and modifications will improve our results even more and give us a truly revolutionary sampling method for marine research.

* * * *



Airplane spotting flight 56-8 (Sept. 27-28, 1956).



Airplane spotting flight 56-8 (Sept. 29, 1956).

PELAGIC FISH DISTRIBUTION STUDY (Airplane Spotting Flight 56-8); In order to continue the study of pelagic fish distribution, abundance, and behavior in central and southern California, that State's Department of Fish and Game operated an airplane spotting flight September 27-29, 1956. The survey was in the inshore area between Half Moon and Pt. Loma. Calif.

Anchovy schools increased in abundance to the south of San Simeon, but decreased in abundance in Monterey Bay since the last flight in August. In comparison with the past two seasons Pacific mackerel continue to be more abundant, but sardines are apparently less numerous and more widely distributed. Except for fog around San Francisco and off the Coronado Strand, clear skies and calm seas prevailed.

Anchovy: No anchovy schools were seen in the area between Half Moon Bay and Cambria. Apparently the spawning adult fish present in Monterey Bay earlier in the month (data gathered from commercial catch sampling) have either moved out of the inshore area or are now schooling deeply and cannot be seen in the day-time.

In southern California and in the central California area from Cambria to Pt. Arguello there has been a decided increase since August in the total area of anchovy schools. The greatest increases occurred near Pismo Beach, Huntington Beach, and San Clemente City. A total of 568 schools (11,689,200 square feet) were tallied in each 10-mile section of the coast in which anchovies were found.

Sardine: Fewer sardines were observed from the air this season than during the past two seasons. The schools seen off Pt. Dume in August could not be located. A commercial spotter sighted sardines off Pt. Dume on September 22 but failed to find them there on September 25. On October 1, however, sardines were caught at night in this area, so the sardines either moved temporarily out of the area or became "night fish," fish that school deeply during daytime and swim near the surface at night.

<u>Pacific mackerel</u>: Pacific mackerel schools are still abundant over the southern California area. The two largest concentrations of these fish were near Oceanside and Newport. Sardines were also seen mixed with the Pacific mackerel but in small numbers.



Canned Fish Consumer Preference Study

BRAND NOT ALWAYS DETERMINING FACTOR WHEN HOUSEWIVES BUY CANNED FISH: More than half the housewives who buy canned salmon and sardines

Table 1 - Percentage of Housewives Indicating Purchases of Selected Canned Fish by Brand										
Regions										
Canned Fishery Product	Total	North East	North Central	South	West					
1/			(Percent)	• • • • • •						
Tuna 1/										
Ask for Brand		64.4	54.7	65.8	61.7					
Do not ask for Brand	41.5	35.6	45.3	34.2	38.3					
Salmon 1/										
Ask for Brand	41.4	50.1	35.7	42.4	37.6					
Do not ask for Brand	58.6	49.9	64.3	57.6	62.4					
Sardines 1/										
Ask for Brand	34.9	46.1	31.7	27.4	39.3					
Do not ask for Brand	65.1	53.9	68.3	72.6	60.7					
1/ Of 2,700 households covered in t	he survey.	2,109 serv	ed canned tuna	, 1,907 serv	ed canned					

1/ of 2,700 households covered in the survey, 2,109 served canned tuna, 1,907 served canned salmon, and 1,394 served canned sardines.

buy without asking for a particular brand. However, a majority are influenced by brands when purchasing canned tuna because canned tuna is more widely advertised than either canned sardines or canned salmon.

Buying by brand is practiced by 58 percent of the housewives who pur-

chase canned tuna; by 41 percent who buy canned salmon; and by only 35 percent

who buy sardines. These facts were brought out by a recent nationwide sample survey of households.

In general, the practice of buying canned fish by brand name is more prevalent in the Northeast region and least in the North Central region.

These findings, which are based on a June 1956 scientific sample survey of 2,700 households distributed throughout the United States, are a part of other data obtained on household consumers' preferences for canned fish and shellfish.

Note: See Commercial Fisheries Review, August 1956, p. 47.

* * * * *

CANNED FISH AND SHELLFISH GENERALLY AVAILABLE AT RETAIL: Practically every housewife (97 percent) in the United States can purchase any item of

canned fish or canned shellfish she wishes at retail. This is the result of the effective functioning of the distribution system in this country. Only about 3 percent of all housewives can not purchase some item

Table 1 - Percentage of Households Indicating if Items of Canned Fish or Shellfish are Available at Retail								
United North Central South West								
	(P	ercent) .						
97	97	97	97	94				
3	3	3	3	6				
2,545	679	730	770	366				
	Shellfis United States 97 3	Shellfish are A United North- States east(P 97 97 3 3	Shellfish are Available United North States east (Percent) 97 97 97 3 3 3	Shellfish are Available at Reta United North Central South States east Cercent (Percent) 97 97 97 97 97 3 3 3 3				

of canned fish or canned shellfish for which they shopped. This small group mentioned such canned items as crab meat, dietetic tuna, clams, smoked fish, clam chowder, and canned whiting. Practically the same situation which exists nationally is observed in each of the four geographic regions.

These findings are based on a June 1956 scientific sample survey of 2,700 households distributed throughout the United States. These data on availability of canned fish and shellfish are one part of a large amount of other data obtained on household consumers' preferences for canned fish and shellfish.

Note: See Commercial Fisheries Review, August 1956, p. 47.

* * * * *

HOUSEWIVES BUY TWO OR MORE CANS OF PET FOOD AT A TIME: About 95 percent of the families in the United States who own a dog or a cat buy two or

Table 1 - Number of Cans of Pet Food Bought at One Time in Terms of Percentages									
Regions									
Item	Total	North- east	North Central	South	West				
All Households Owning a		(Percent)						
Dog or Cat That Use Pet Food Containing Fish1	100.0	$\frac{2}{100.0}$	$\frac{2}{100.0}$	100.0	$\frac{2}{100.0}$				
No. of Cans Purchased									
at One Time: One Can	5.3	4.8	7.7	3.6	5.8				
Two Cans	10.5	14.5	12.1	9.5	5.8				
Three Cans	22.9	27.7	19.8		24.6				
Four Cans	15.2	12.0		16.8	11.6				
Five or More Cans	45.0	41.0	40.6	48.2	49.3				
Don't Know	1.1	-	1.1	0.7	2.9				
Weighted Base	380	83	91	137	69				
1/ Some households own more than one	pet. 2/ R	elatively unst	able due to the s	small numbe	er of cases.				

more cans of pet food at a time. Forty-five percent of the pet owners usually purchase five or more cans. Another 15 percent usually buy in units of four. About one in every three families in the United States owns a dog and one out of five families owns a cat.

These findings are based on a recent scientific sample survey of household consumers' preferences for canned fish and shellfish which was conducted among 2,700 households distributed throughout the United States. One of the objectives of the survey was to determine the most frequent answer to the question "How many cans of pet food do you usually buy at one time?"

The responses indicate that it might be advisable for processors to consider packaging cans of pet food in handy containers holding more than one can.

Final results of the survey, which is being financed by funds provided by the Saltonstall-Kennedy Act of 1954, are scheduled for publication the early part of next year. The Fish and Wildlife Service contracted with W. R. Simmons and Associates Research, Inc., New York City, to conduct the survey.



Federal Purchases of Fishery Products

Fig. 1 - Canned Fishery Products Purchased Through Quartermaster Market Centers, January-September 1956

Period	Tuna	Salmon	Sardines
	(1,000 Pou	ınds)
Jan-Sept	2,227	601	inds)

CANNED FISHERY PRODUCTS PURCHASED THROUGH QUARTER-MASTER MARKET CENTERS, JULY-SEPTEMBER 1956: Only insignificant amounts of canned tuna and sardines were purchased for the use of the U.S. Army,

Navy, Marine Corps, and Air Force by the Army Quartermaster Corps through its Market Centers during the third quarter of 1956. Purchases amounted to 39,000 pounds of canned tuna and 4,000 pounds of canned sardines. No canned salmon was purchased.

Note: Also see Commercial Fisheries Review, October 1956, p. 15.

* * * * *

FRESH AND FROZEN FISHERY PRODUCTS PURCHASED BY THE DEPART-MENT OF DEFENSE, SEPTEMBER 1956: The Army Quartermaster Corps in September 1956 purchased about 2 million pounds (valued at \$996,628) of fresh and

frozen fishery products for the use of the Army, Navy, Marine Corps, and Air Force. This was 31.5 percent less in quantity and 29.0 percent less in value than the purchases made in August 1956, but higher by 8.8 percent in quantity and 20.7 percent 1,958 1,799 20,232 19,257 997 826 10,105 8,296

Department of Defense (September and the First Nine Months of 1956 with Comparisons)									
QUANTITY VALUE									
Sept.	JanSept.	Sept. JanSept							
1956 1955	1956 1955	1956 1955	1956 1955						
(1,000 Pounds) (\$1,000)									

Purchases of Fresh and Frozen Fishery Products by

in value than purchases made in September 1955.

Purchases of fresh and frozen fishery products during the first nine months of 1956 totaled 20.2 million pounds (valued at \$10,104,809) - an increase of 5.1 percent in quantity and 20.7 percent in value than purchases made during the same nine months in 1955.

Prices paid for these fishery products averaged 50.9 cents a pound in September 1953 as compared with 49.1 cents a pound the previous month and 45.9 cents a pound in September 1955.

* * * * *

NEW AGENCY REPLACES QUARTERMASTER MARKET CENTER SYSTEM: As a major step towards activating the single manager subsistence program, the Military Subsistence Supply Agency (MSSA) was established, effective October 26, 1956, to replace the Quartermaster Market Center System.

The new organization effects the following changes: (1) Quartermaster Market Center System, 226 West Jackson Blvd., Chicago 6, Ill., changed to Headquarters, Military Subsistence Supply Agency at the same address; (2) the Quartermaster Market Centers changed to Military Subsistence Market Centers.

The new organization will be somewhat limited in functions until the completion of transfer of the Quartermaster Inspection Service Command and some other food distribution services. All military subsistence supply has now been brought under the jurisdiction of the new organization.



Fish Sticks First to Bear U.S. Shield and Grade Labelling

The first fishery product ever to bear the U.S. shield and grade labelling, indicative of voluntary continuous in-plant inspection and grading, is now available on the market. This is the consummation of the work of U.S. Fish and Wildlife Service technologists working on frozen fried fish sticks in cooperation with members of the fishing industry and with the National Fisheries Institute. The U.S. Department of Agriculture, using the standards and inspection manuals developed by the Department of Interior's Fish and Wildlife Service, now makes this inspection and grading service available to the industry. Three plants processing fish sticks are now under continuous inspection. Other specific lots of fish sticks are now being graded at the request of prospective buyers.

The Service is continuing its work on the development of standards for the fishing industry. It is planned that similar proposed standards, now well-advanced, for frozen fish fillet blocks and for raw breaded fish portions will be published in from three to five months. Thus, a complete set of interrelated standards will soon be available for use in a grading service from the raw material stage to the important heat-and-serve products of one segment of the fishing industry.



Georges Bank Hydrographic Resurvey Planned

A resurvey of Georges Bank, off the Massachusetts coast, an area which is considered by the New England commercial fishing industry as its most important economic asset, will be made by the U. S. Coast and Geodetic Survey, the Secretary of Commerce announced October 30, 1956.

Such a survey of the famous shoals area, the first in 25 years, is needed, the Secretary said, to provide more accurate hydrographic information for the North

Atlantic fishing fleet and a detailed survey in the vicinity of the first Air Force-operated Texas Tower, radar warning station of the Air Defense Command, located at Georges Bank.

The Coast and Geodetic Survey Ship <u>Hydrographer</u>, which has been operating this past year in the Straits of Florida and the Caribbean, is preparing to shift its operations to Georges Bank in March of 1957. It is hoped that the project can be completed within a single surveying season, ending about October 1. The 67-foot <u>Hydrographer</u> has a complement of 65 officers and men, plus occasional extra technicians.

Commercial fishing industry spokesmen have advised the Department of Commerce that fish production from the Georges Bank area is particularly vital to the fishing industry of Boston. Other ports, such as Gloucester and New Bedford, depend heavily on this bank for a constant supply of fish.

In addition to the periodic inspections and checks made by the Coast and Geodetic Survey, many fishing skippers and boat owners in recent years have been reporting evidence of a series of major changes in the shoals and channels of the Georges Bank area which they believe could be of serious import to normal fishery activities. These reported changes have created much anxiety and apprehension among all fish producers, and it is believed that the forthcoming new survey will prove of extreme value to them.

Coast and Geodetic Survey officials also are contemplating the possibility of a partial resurvey of the Nantucket area, where the next Texas Tower is to operate, after the completion of the Georges Bank hydrographic study. The Nantucket area was last surveyed in detail during 1940.

The survey of the Georges Bank area, beginning about 60 miles east of Cape Cod, will cover about 4,600 nautical square miles of Atlantic Ocean bottom, resulting in greatly improved charts for the safety of navigation and the fishermen's operations there.

The Radio Accoustic Ranging System, used when the existing Coast and Geodetic Survey charts for Georges Bank were first published in 1931-32, is now obsolete. Much more modern and accurate methods are now employed, notably the Electronics Position Indicator System.

Equipped with this system, a combination of features of Loran and Shoran, the <u>Hydrographer</u> two years ago made a new survey of Brown's Bank, off Nova Scotia, another area used extensively by the fishing fleet. Such surveys contribute not only to the development of maritime resources and especially aid the fishing industry, but they also assist in meeting national defense planning needs.

The <u>Hydrographer</u> was one of four Coast and Geodetic Survey ships which made thousands of soundings and took numerous samples of ocean bottom deposits in conducting the Goerges Bank survey of the early Thirties. The charts and other data thus produced developed a wealth of detail of great value to the fishing industry. Deep gorges or valleys, some more than 150 fathoms deep, were discovered on the eastern and southern profiles of Georges Bank, and information about bottom characteristics proved another important factor in the carrying out of fishing operations, not only in regard to navigation but also in the study of the movement of fish.

With the recent evidences of changes in ocean bottom in the Georges Bank area, the forthcoming new survey is designed to bring all charts up to date and supply additional data to assist the fishermen and operators of both small and large vessels who ply the waters there.

The survey ship which will be used to make the Georges Bank survey has been engaged in its unique type of duty since she was launched at Portsmouth, Virginia, in 1929. The 1100-ton <u>Hydrographer</u> has had her outer appearance changed several times through the years as she has been re-equipped to keep her abreast of scientific advances and service. She has two 26-foot power launches which permit her crew to survey shoal areas too shallow to accommodate the mother ship.



Great Lakes Fishery Investigations

SURVEY OF SAGINAW BAY CONTINUED BY M/V "CISCO" (Cruise 7): Experimental fishing during a cruise by the Service's research vessel Cisco from October 2-5, 1956, was confined to Saginaw Bay. Considerable trawling was done in a very shallow area near the southwest end of the Bay. This area had not been visited before, since weather conditions need to be ideal for the Cisco to venture into such shoal water. Yellow perch (Perca flavescens) fingerlings were numerous, and alewife fingerlings (Pomolobus pseudoharengus) were extremely abundant. About 6,000 of the latter species, ranging in length from 1.5 to 3.0 inches, were taken in a 35-foot trawl in one 5-minute bottom tow, and 8,500 were caught in a 5-minute tow just off the bottom. Smelt (Osmerus mordax) fry were almost as plentiful as the alewives off the bottom, but not nearly so numerous on the bottom. Small numbers of young-of-year black crappies (Pomoxis nigromaculatus) and bluegills (Lepomis macrochirus) were also caught in the shallow water. Trawling operations were also carried out in 6 to 11 fathoms off East Tawas. Catches consisted mostly of perch and smelt fry. Most of the adult smelt appear to have left this portion of the Bay; probably a seasonal movement. Night trawling studies were carried out in the area north and west of Charity Island. Midwater tows and bottom tows in the shallower $(3\frac{1}{2}-4 \text{ fathoms})$ waters caught only a few perch and smelt fry, but one 5-minute bottom drag with a 35-foot net in deeper water (11 fathoms) took nearly 1,800 perch.

Gill nets were set obliquely from surface to bottom off East Tawas in 13 and 26 fathoms of water, and a bull net (300 feet long, 120 meshes deep) was set at the latter depth. Nothing was taken at the shallower depth. The deeper oblique set caught only a few bloaters (Leucichthys hoyi), longjaws (Leucichthys alpenae), and smelt. The fish were concentrated between 80 and 140 feet under the surface. The bull net was set so that its float line was just above the thermocline at 120 feet, and its lead line was beneath the thermocline at 140 feet. It caught 120 bloaters, 2 longjaws, and 41 smelt in an overnight set. Lake herring (Leucichthys artedi) have apparently not yet entered the Bay in any numbers for spawning, since none of this species was caught.

A gill net $(2\frac{1}{4}$ -, $2\frac{1}{2}$ -, $2\frac{3}{4}$ -, 3-, and 4-inch mesh) set on the bottom in the harbor just off East Tawas in $4\frac{1}{2}$ -5 fathoms of water caught 168 medium-size perch. The catch also included two walleyes (Stizostedion vitreum), one white bass (Lepibema chrysops), and 24 white suckers (Catostomus commersoni).

Hydrographic transects were run from Bay City to East Tawas, East Tawas to Harbor Beach, East Tawas to Oak Point, and Hat Point to Au Sable Point. Surface water temperatures are continuing to drop and the epilimnion has become about 125 feet thick. Surface water temperatures ranged from 10.8° C. (51.4° F.) to 15.4° C. (59.7° F.).

Hawaii

COMMERCIAL FISHERIES CATCH FOR 1955: The landings in 1955 of oceancaught fish and shellfish by the commercial fishermen of the Territory of Hawaii amounted to 15.4 million pounds, valued at \$3.1 million, according to a statistical summary from the Hawaiian Division of Fish and Game. This total was lower by

		195	5	ecies, 1955 and 1954 1954 1/	
9	Species	Quantity	Value	Quantity	Value
English	Hawaiian	1,000 Lbs.		1,000 Lbs.	
Ocean Catch:					
Amberjack	Kahala	83	17	68	13
Big-eyed scad	Akule	304	192	324	205
Dolphin	Mahamahi	265	86	236	77
	f Weke-ula				
Goatfish	Weke	151	92	169	100
Goatrish	Moana	151	92	169	100
	Kumu				
Jack crevalle	Ulua	170	54	215	63
Mackerel	Opelu	288	98	274	88
Sea bass	Hapuupuu	66	20	40	12
Snapper:					
Gray	Uku	82	28	66	24
Pink	Opakapaka, kalekale	215	94	175	71
Red	Ulaulu Koae & Ulaula	104	75	105	72
Swordfishes &	A'u	787	185	1,063	183
Spearfishes				-,	
Tuna & Tunalike		21	4		
Albacore & Bluefin	Ahipalaha	21	4	29	5
		2,154	687	2,759	672
Big-eyed Yellowfin	Abd	446	140	526	137
Skipjack	Ahi	9,695	1,115	14,021	1,761
Bonito	Aku Kanakawa	40	7,113	23	1,101
	Ranakawa		-		- 1
Miscellaneous		480	203	432	166
Total Ocean Cat	ch	15,351	3,097	20,525	3,653
Pond Catch:					
Clam	Olepe	7	1	13	3
Crabs	Olope TTTTTTTTTTT	5	2	4	2
Milkfish	Awa	16	8	16	7
Mullet	Amaama	52	43	41	37
Ten pounder	Awaawa	5	2	2	1
Miscellaneous		22	12	10	5
Total Pond Cate	h	107	68	86	55
Grand Total		15,458	3,165	20.611	3,708

5.2 million pounds, or 25.2 percent, in weight and \$0.6 million, or 15.3 percent, in value than the previous year. The decrease in the 1955 catch was due largely to the skipjack catch which declined 4.3 million pounds (30.9 percent) from the 14 million pounds reported for this species in 1954. The catch of some other important species was also down from 1954 -- yellowfin tuna down 15.2 percent, big-eyed tuna lower by 21.9 percent, black marlin down 41.1 percent, and big-eyed scad 6 percent lower. However, there were some increases in the catch of striped marlin, dolphin, and pink snappers. The value of the ocean catch in 1955 declined only 8.5 percent as compared with the 1954 value of \$3.7 million, due to higher ex-vessel prices for some important varieties, particularly yellowfin and big-eyed tuna, which brought an average of \$0.318 a pound in 1955 as compared with

\$0.246 a pound in 1954. In addition to the ocean catch, 106,868 pounds, valued at \$68,566, of pond fish were reported as compared with 86,000 pounds, valued at \$55,000 dollars in 1954.

The 1955 commercial catch of ocean fish from the island of Oahu made up 71.7 percent of the total. Of the six island areas that reported a commercial fish catch, 71.4 percent was made during the April-September period. The best single month's catch was made in June when 17.3 percent of the ocean catch was landed.



Marketing Prospects for Edible Fishery Products, Winter 1956/57

United States civilian consumption of fishery products during the six months of September 1956-March 1957 is expected to be slightly larger than a year earlier. The increase will likely be both in the canned and the frozen commodities. Retail prices of fishery products in the coming months are expected to remain above a year earlier.

Supplies of fresh and frozen fishery products through next winter may total close to those of a year earlier. Commercial landings, now on the seasonal downturn, are not expected to differ substantially from those of last fall but moderately

heavier imports of frozen products are likely. Stocks of edible frozen products in cold storage on October 31 were larger than those on the same date last year. Storage holdings are the most important source for frozen fishery commodities consumed during the winter months when commercial landings are seasonally lowest.

More canned fishery products will be available during the current marketing year-which ends about mid-1957-than in the preceding year. The 1956 pack of salmon was a little larger than the very small output in 1955, but the packs of Maine sardines, tuna, and mackerel will be up considerably. The current year's pack of California sardines (pilchards) is now under way, and it is still too early to forecast the output. Domestic production of canned fishery products during the current marketing year will be supplemented to some extent by imports. Canned salmon imports probably will again be heavy since the pack increase in the United States and Alaska is not sufficient to meet expected consumer demand.

Total imports of the major fishery products in the next few months are expected to continue at a higher rate than a year earlier. The larger part of the increase probably will be for the frozen items; imports of the canned products will likely be up only slightly. Exports during the next few months may be no larger than a year ago because of the limited supplies of the canned fishery products which are polular in our foreign markets.

This analysis appeared in a report prepared by the Agricultural Marketing Service, U. S. Department of Agriculture, in cooperation with the U. S. Fish and Wildlife Service, and published in the former agency's November 2, 1956, release of The National Food Situation (NFS-78).



Maine Sardines

CANNED SARDINE STOCKS, NOVEMBER 1, 1956: Distributors' stocks of Maine sardines totaled 388,000 actual cases as of November 1, 1956, an increase of 34,000 cases or 9.6 percent over the 354,000 cases held by distributors on November 1 a year earlier. Stocks of Maine sardines held by distributors on July 1, 1956, amounted to 154,000 cases according to estimates made by the U.S. Bureau of the Census.

Fig. 1 - Canned Maine SardinesWholesale Distributors & Canners Stocks, November 1, 1956, with Comparisons									
Type Unit 1956/57 Season 1955/56 Season 11/1/56 7/1/56 6/1/56 14/1/56 11/1/56							11/1/55		
Distributors' Stocks	1,000 Actual Cases	388	154	160	268	326	354		
Canners' Stocks	1,000 Actual Cases 1/	1,016	315	64	152	475	625		
$1/100 \ 3\frac{1}{4}$ -oz. cans e	equal one standa	rd case.							

Canners' stocks on November 1, 1956, as reported by the Maine Sardine Industry were 1,016,000 cases (100- $3\frac{1}{3}$ -oz. cans) on November 1, 1956, as compared with 625,000 cases on the same date in 1955. Stocks held by the canners on July 1, 1956, totaled 315,000 cases.

The pack of Maine sardines from the beginning of the season on April 15 to November 1, 1956, totaled 2,101,000 cases, 80 percent or 934,000 cases above the pack

on the same date in 1955. The pack of Maine sardines in 1954 amounted to 2,934,000 standard cases (100 $3\frac{1}{4}$ -oz. cans).

* * * * *

CANNING SEASON ENDED DECEMBER 1 WITH FAIR PACK: The 1956 Maine sardine season closed on December 1, 1956, with a pack of about 2,200,000 cases (100 $3\frac{1}{4}$ -oz. cans), states the Maine Sardine Council in a December 1 news release.

The Executive Secretary of the Council said that the pack was well ahead of the abnormally short pack of about 1,268,843 cases in 1955, but still far below the 2,690,000-case (10-year) average.

Thirty-eight plants from Portland to Robbinston, Maine, were in operation during the seven-months season, but the fish ran consistently only in waters west of Rockland, or the southern half of the State. This area supplied most of the sardines for Washington County at the eastern end of the State, which has a heavy concentration of plants.

The Washington County canners were plagued with a scarcity of fish in their area for the fifth year in a row and are patiently awaiting a report from biologists who are endeavoring to find the reason and the cure.

The Secretary said that rising costs and the fluctuating fish supply clouded the profit picture for canners despite the fairly large pack. Sales were normal throughout the season and he predicted a sellout of the pack before the plants started operating again in 1957 (season April 15-December 1).

Due to the short 1955 pack, the sardine industry went into the new season with one of the smallest carry-overs in history and the total supply is predicted to be inadequate to fill the normal demand.

He stated that the canned pack was of excellent quality and that the canners had been given much assistance along these lines through an industrywide research and grading program which was launched three years ago.



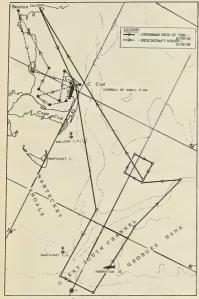
North Atlantic Fisheries Exploration and Gear Research

BLUEFIN TUNA COMMERCIAL DISTRIBUTION IN NORTHWEST ATLANTIC SURVEYED BY M/V "DELAWARE" (Cruise 27): Over 1,600 miles of the offshore Northwest Atlantic area was scouted by the Service's exploratory fishing vessel Delaware for possible commercial concentrations of bluefin tuna (Thunnus thynnus) during cruise 27, completed on November 2, 1956. Results from the exploratory work indicated sizable surface schools were present in the South Channel area, but the area far offshore and south to the vicinity of the Gulf Stream track produced no positive indications of surface-schooling tuna.

Several surface schools of varying size were spotted in the general area of the South Channel. The school sizes ranged from scattered breaks to one area of 200 yards in diameter. Surface temperatures in the area of the bluefin schools ranged from 57 to 67 F. Troll lines were used continuously while running during daylight hours with only two strikes during the trip, one a 32-pound bluefin taken in the South Channel area and one small dolphin (Coryphaena hippurus) taken while trolling

near the Gulf Stream. Seventeen dolphin were caught on hand lines during the trip.

Ten small schools and one medium-size school (estimate 15 tons) were sighted by the Delaware soon after departure from Boston on October 16, 1956.



Aerial fish spotting flights (56-1 & 2) October 29 & 30, 1956.

The <u>Delaware</u> proceeded in rough weather to the northeast edge of Georges Bank where squid were trawled for bait. Taking advantage of good weather, the <u>Delaware</u> scouted south into the warmer <u>Gulf Stream</u> track where water temperatures ranged from 74° to 75° F. Several dolphin were taken on hand lines in the Gulf Stream area, but no surface tuna or bird flocks were sighted. After scouting along the northwest side of the Gulf Stream, the <u>Delaware</u> returned toward the coast. Rough weather making scouting for school tuna virtually impossible was encountered both before and after leaving the port of New Bedford.

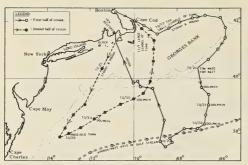
After proceeding SW. from New Bedford, two possible tuna schools were sighted in the area 38 $^{\circ}18^{\circ}$ N. latitude, 69 $^{\circ}30^{\circ}$ W. longitude. Several dolphin were again taken by hand line in the warmer water, the largest weighed $26\frac{1}{2}$ pounds.

Upon returning to the South Channel area on November 1, 1956, 3 large schools of bluefin were sighted and chumming with squid was attempted, without results; however, trolling in the area for some period of time produced one 32-pound bluefin.

spotting in conjunction with the <u>Delaware's cruise 27</u> was conducted on October 29, 1956, when an opportunity to accompany a U. S. Coast Guard overwater training flight gave an excellent chance to survey the South Channel area (flight 56-1). Although conditions were ideal for fish spotting, no surface schooling tuna were spotted. Three swordfish were seen in the east side of the South Channel and several (12+) large schools of small fish near shore in Cape Cod Bay extending south from off Provincetown. Also, one school was sighted in shallow water near Race Point. Cape Cod Bay was not searched on the 29th for tuna, as the major objective of the survey was the offshore area.

During the evening of the 29th, over 37,000 pounds of bluefin were taken in the Provincetown traps and as a result a flight to survey the Cape Cood area was made on October 30, 1956 (flight 56-2). The extensive schools of small fish (unidentified as to species) were still present in the inshore area with the center of distribution about three miles S. of Provincetown. A small school of bluefin (15-20 in number) was spotted in the bay about 5 miles S. of Provincetown indicating that tuna were still present in the inshore areas.

The <u>Delaware</u> was scheduled to depart from East Boston, November 14, 1956, to conduct exploratory scallop dragging in offshore areas where the commercial fleet does not normally operate.



M/V Delaware Cruise 27 (October 16-November 2, 1956).

The two-week scallop exploratory trip was to systematically survey portions of Brown's Bank and areas within the Gulf of Maine for commercial concentrations of ocean scallops (Pecten grandis). Approximately one week will be spent in each area investigating its commercial potential. A standard commercial 11-foot New Bedford scallop dredge was to be used in all explorations. This would enable the Delaware to give accurate catch information to the commercial fleet. Catch information was to be supplemented by hydrographic observations in

the form of bottom temperature recordings, and the taking of bottom samples at specified intervals.

This is the first in a series of exploratory fishing operations designed to investigate the many areas not fished at present, with the hope of finding commercially-profitable scallop beds which would be available to the New England fleet.



North Atlantic Fisheries Investigations

STUDIES INTO FEEDING HABITS OF LOCAL FISHES (M/V \underline{T} -79 Cruise 8): To conduct studies into the feeding habits of local fishes and to make a hydrographic transect of the "Deep Hole" off the New England coast were the objectives of cruise 8 of the Service's research vessel \underline{T} -79, which sailed October 10, and returned to Woods Hole, Mass., October 12, 1956.

The hydrographic transect of "Deep Hole" was accomplished without difficulty. Samples of water were saved for salimity, phosphate, and nitrate analysis. On September 12 (T-79 Cruise 6), a moderately-developed thermocline existed throughout the area with a temperature spread from top to bottom of more than 15 F. On October 13 the surface had cooled over 6 F. and the thermocline was gone, the spread of temperature being less than 7 F. in the deepest part. The picture presented by the distribution of nutrients and 0, showed that the "Deep Hole" was in a state of flux. A wedge of water moving into the "Deep Hole" from the onshore side was replacing the colder and nutrient deficient water. Within this wedge, local fishermen were catching relatively large numbers of blackback flounders in addition to the other species commonly found there.

Where the bottom water had not yet been replaced, no blackbacks were caught. On September 12 when conditions were relatively stable, the common flatfish on the edge of the "Deep Hole" was the yellowtail flounder. No yellowtails were caught during this cruise.

* * * * *

UNDERWATER TELEVISION OBSERVATION OF FISH CAPTURED BY OTTER TRAWL: In order to observe the behavior of fish while being captured by an otter trawl, the Service's North Atlantic Fisheries Investigations chartered the M/V Huckleberry Finn for some underwater observations with a television camera. The

Huckleberry Finn was joined on the Amagansett grounds off Long Island, N. Y., by the William Chesebrough, a Pt. Judith trawler trawler. The cruise operations were conducted October 29-November 1, 1956.

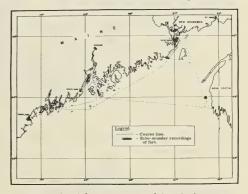
The otter trawl was located by a recording echo-sounder approximately 450 feet behind the trawler <u>William Chesebrough</u>, in 50 to 80 feet of water. A tow line was made fast from the <u>Huckleberry Finn</u> to maintain this distance. The television camera with fins attached and an "Issacs" depressor at the end of the support chain was lowered to observe the net.

Locating the net was difficult because of turbidity and the variables involved in positioning the camera with a two-boat operation. Some views of netting at close range were obtained however.

North Atlantic Herring Research

SETTING OF PURSE SEINE FROM DECK OF DRAGGER TESTED (M/V Metacomet Cruise 9): Trial sets of a purse seine were made in Linekin Bay and Penob-

scot Bay by the Service's chartered exploratory fishing dragger Metacomet in order to determine if a New England dragger-type vessel could be adapted to purse-seining operations without the use of an auxiliary seine boat. Then it would be possible for a vessel of such seaworthy design as the Metacomet to be used in offshore waters of the Gulf of Maine without running the risk of losing a valuable seine and seine boat. In addition, if successful, purseseining from the deck of a vessel (particularly if the power block was used) would enable the vessel to operate with about half the crew needed to set and purse the seine by the tradition-



U. S. Fish and Wildlife Service cruise 9 of charted M/V Metacomet.

al methods used in the Gulf of Maine. In New England, purse seiners using the combination mothership and seine boat are limited to fishing during good weather. The second objective of this ninth and final cruise (October 18-27, 1956) of the Metacomet was to locate herring by echo-sounder and visual observation.

The waters indicated on the chart were sounded. Fish were located in Passamaquoddy Bay, Grand Manan Channel near Cutler, Trinity Ledge on the Coast of Nova Scotia, Isle Au Haut Bay, and West Penobscot Bay. Echo-sounder recordings and sampling with a small midwater trawl indicated that the fish located in these areas were small herring between 3 and 5 inches in length. The seine was not set on these soundings since the fish were too small and often too deep to be caught.

In each of the trial sets of the seine made in Linekin Bay and Penobscot Bay, the seine was set smoothly over the starboard gunwale from the well deck of the vessel. Purse lines were pulled through blocks on a seine davit to winch heads on the trawl winch and the seine was hauled aboard with a "Puretic" power block. Although some difficulty was experienced with the seine becoming fouled in the purse

line, these trials demonstrated that a purse seine can be set and hauled using this type of vessel, properly equipped. The problems of purse-line fouling might be overcome by small changes in the method of setting and pursing the net or by slight modification of the seine hanging.



North Pacific Exploratory Fishery Program



M/V John N. Cobb Cruise 29 (Oct. 1-Nov. 16, 1956).

pollock, and ratfish, were taken in this area in amounts from 150 to 2,400 pounds per hour. The dragging bottom off Baker Island was generally good at depths of 55 to 95 fathoms. Soundings made in the "trough" between Dall and Forrester Islands revealed no suitable dragging bottom. No clear dragging bottom was located along the 115-fathom "edge" between Forrester Island and Baker Island.

Favorable catches of rockfish were made at depths of 112 to 139 fathoms off Iphigenia Bay, with the best drag yielding a total of 2,100 pounds of rockfish, including 1,200 pounds of blocking, 1500 pounds of blocking, 1500

BOTTOM FISH GROUNDS OFF
SOUTHEASTERN A LASKA SURVEYED BY M/V "John N. Cobb"
(Cruise 29): Several species of commercially-desirable bottom fish were
caught off the west coast of Prince of
Wales Island, Alaska, during a cruise
from October 1 to November 16, 1956,
by the Service's exploratory fishing
vessel John N. Cobb.

A series of 30 otter-trawl drags were made at depths of 57 to 208 fathoms between Dixon Entrance and Iphigenia Bay. Although good trawling bottom was located in some areas, extensive soundings made with a recording depth-sounder also revealed large areas of unsuitable trawling bottom. In some cases, bottom obstructions were encountered by the trawl gear where depth recordings had indicated favorable trawling bottom.

Although no large catches of commercially-desirable flatfish were made, several drags off Baker Island at depths of 57 to 95 fathoms caught dover sole, petrale sole, rex sole, and rock sole in amounts up to 200, 150, 250, and 175 pounds, respectively, an hour. Trash fish, mostly turbot,



A good catch of bottom fish being sorted aboard the M/V John N. Cobb.

pounds of black rockfish, 800 pounds of Pacific ocean perch, and 100 pounds of red

rockfish in one hour. Turbot and pollock dominated the catches at these depths. The dragging bottom was exceptionally good in this area.

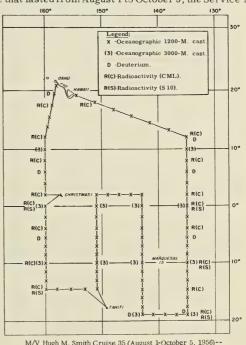
Stormy weather seriously curtailed exploratory fishing activities throughout the entire period of the survey, resulting in inconclusive findings regarding the extent of the available grounds suitable for otter trawling and the abundance of commercially-desirable species of fish present.

Pacific Oceanic Fishery Investigations

OCEANOGRAPHY OF PACIFIC EQUATORIAL REGION SURVEYED (Hugh M. Smith, Cruise 35): During a cruise that lasted from August 1 to October 5, the Service's

research vessel Hugh M. Smith occupied 79 oceanographic stations as part of an international survey (EQUAPAC) of the Pacific equatorial region between 135° W. longitude and the Philippine Islands. The area surveyed included a study of the circulation features and areas of potential productivity in the region of the Marquesas and Tuamotu Islands. A total of 79 oceanographic stations. bathythermograph lowerings, zoopiankton tows, and pelagic trawl hauls were the principal operations during the cruise. Field examination of the plankton volumes showed that in general the quantities collected during night-time tows were 1 to $1\frac{1}{2}$ times those taken during daylight hours and that the volume of plankton decreased rapidly south of the equator.

A watch was maintained during daylight hours for tuna schools and bird flocks while the vessel was under way. A total of 85 bird flocks and 60 tuna schools were sighted; 39 of the tuna schools were unidentified, 13 were identified as skipjack, and 8 as yellowfin.



M/V Hugh M. Smith Cruise 35 (August 1-October 5, 1956)-shows oceanographic stations completed for EQUAPAC.

Of the \$5 bird flocks sighted, only 28 were seen during passage south of the equator between 135 W. and the island of Tahiti, 43 were sighted between Tahiti and Honolulu. Of the 60 tuna schools, 36 were sighted between Tahiti and Honolulu, of which 24 were located between 4 S. and Christmas Island on 160 W.

A 45-station pattern, a continuation of the 18-month monitoring survey in the area of the Hawaiian skipjack fishery, was completed around the island of Oahu prior to proceeding south for EUQAPAC.

SKIPJACK TUNA TAGGED WITH HARPOON-TYPE TAG RECOVERED: Considerable interest was engendered by the return of a skipjack tuna that had been tagged with the new harpoon-type tuna tag developed by the Pacific Oceanic Fishery Investigations. This tag is of all-plastic construction and so far has been placed on small lots of skipjack only. The single return, at liberty for 3 months, was surprising in view of the fact that only 45 specimens had been released with the new tag. The tag wound had healed nicely, and an autopsy of the specimen indicated that the fish was not at all handicapped by the new tag. It is too early to state just how successful the tag will ultimately be, but it is now known that it can be placed on tuna in approximately $\frac{1}{4}$ the time that it takes to tag fish with the conventional "spaghetti" tag. This means that several times as many fish can be tagged with a given crew of men and that returns should be better, simply because the tuna are out of the water for only a few seconds during the tagging.

* * * * *

RESEARCH FOR THIRD QUARTER 1956 (July 1-September 30, 1956): Highlights of the third quarter's research results of the Service's Pacific Oceanic Fishery Investigations included the finding of large numbers of albacore tuna north of Hawaii; completing tests on tilapia that establish its usefulness as tuna bait; completion of the field work of EQUAPAC, an oceanwide survey of the equatorial Pacific; and a second stocking of the Marquesan sardine in Hawaiian waters. Details of some of the research results follow:

Equatorial Tuna Research: In conjunction with POFT's oceanographic and fishing surveys in the Marquesas Islands area, the Service's research vessels Hugh M. Smith and the Charles H. Gilbert participated in EQUAPAC, the multiple-vessel survey of the Pacific equatorial region between 135° W. and the Philippines. Departing on August 6, 1956, the Charles H. Gilbert returned to Honolulu on September 26, 1956. Using long line, she found yellowfin tuna most abundant near the equator (132° W. longitude) and in the Marquesan coastal waters; big-eyed were never abundant, although a few large specimens (300-370 pounds) were taken between 5°-11° S. latitude. Albacore began appearing in the long-line catch at 12° S., but the greatest number of this species were taken in the Marquesan coastal waters. A few large skipjack were taken at scattered stations.

Only a few surface schools (16) were sighted in the vicinity of the Marquesas. Ten were chummed with Marquesan sardines. Five were identified as skipjack, one of which yielded 344 skipjack averaging 5 pounds in weight. A 16-pound specimen was taken from one yellowfin school fished.

Seven bays in the Marquesas were sampled for bait. Sardines (<u>Harengula vittata</u> was the predominant species) were seen in nearly every area scouted but were nowhere abundant. A total of 305 buckets of various species were caught; 62 buckets of the sardines were placed aboard the <u>Charles H. Gilbert</u>, returned to Oahu, and 21 were released in Hanauma Bay, Oahu.

Another tagged yellowfin was recovered during the quarter in the Line Islands area. This marks the second recovery from a total of over 1,000 tagged in this area. Tagged near Christmas Island on October 8, 1955, the yellowfin was recaptured in the same vicinity on August 2, 1956, thus was at liberty for 299 days.

Albacore Research: The most significant development during the quarter was the success of the exploratory fishing cruise of the John R. Manning (cruise 32) made from July 16 to September 12 to the waters north of the Hawaiian Islands. The purpose of the cruise was to determine if there

were sufficient quantities of albacore to support a commercial fishery in the area where they were found during the summer of 1955 by the vessels of the Service's Pacific Salmon Investigations, Paragon and Mitkof, and the POFI vessel Hugh M. Smith. The results of the cruise showed that they were present in parts of the area covered by the cruise, roughly 40° N. to 49° N. between 175° W and 145° W., in amounts approaching commercial quantities. The pattern and magnitude of the individual catches showed that they were most abundant west of 160° W. between 43° N. and 47° N. East of 160° W. the catches decreased progressively to the eastward. A total of 604 albacore were taken; 453 in the gill nets, 47 in the trammel nets, and 104 on the trolling lines. The best day's catch in the gill and trammel nets was 89 and the best by trolling was 35. Eighty-six of the troll-caught fish were tagged and released. Almost all of the remaining fish (6,597 pounds) were delivered to the cannery. Only 102 pounds or about 2 percent of the fish were rejected, making the total penalty against catch 306 pounds or 4.6 percent. (See Commercial Fisheries Review, November 1956,

Another item of interest during the quarter was the report of the capture of two more tagged albacore. They were both fish that had been released about a week apart during the fall of 1955. They were recaptured about 6 weeks apart, one in the Japanese spring fishery and one in the United States west coast fishery. The latter gives the first positive evidence of easterly migration of albacore from mid-ocean.

Tuna Bait Studies with Tilapia: In the spring of 1956, the Hawaiian Tuna Packers, Ltd. and the Pacific Oceanic Fishery Investigations joined forces in an informal agreement for the purpose of seining supplies of small bait size Tilapia and testing these fish at sea to determine their qualities as skipjack bait. Seven full days and 2 half days of seining yielded approximately 600 pounds of small tilapia. These were obtained from freshwater ponds and therefore had to be acclimatized to sea water before the sea tests.

The effective use of tilapia as skipjack tuna bait was examined on 14 vessel days at sea in waters off Oahu. It was the prime objective of these tests to compare the ability of nehu (the standard bait) and tilapia in attracting and holding schools of skipjack at the stern of the vessel. A summary of the results shows that 21 (56 percent) of the 37 schools chummed with nehu surfaced and responded to the bait, whereas 10 (62 percent) of the 16 schools chummed with tilapia gave a favorable response to the bait.

Skipjack were caught from 9 schools at the rate of 3.5 fish per bucket of tilapia used. This is not as good as the catch rate of 8.2 skipjack per minute and 15.2 per bucket of bait obtained with nehu, but there is every reason to believe that with experience chummers will learn to use the new bait more effectively.

It is our conclusion that tilapia is an adequate bait for catching skipjack. In some respects it may be slightly inferior to nehu, but it has several compensating qualities. It is an exceedingly hardy fish and can survive in bait tanks for much longer periods than the nehu. The larger tilapia tend to sound when thrown out as chum, but this trait is not prevalent in fish $1\frac{1}{2}$ to 2 inches in length, which is the optimum size for skipjack bait. Our studies

indicate that if economically feasible rearing methods can be developed, the tilapia can alleviate the great need in the Hawaiian skipjack fishery for additional bait supplies.

"Greening" in Yellowfin: In investigating the chemistry of "off-color" or "greening" in yellowfin tuna, additional studies have been conducted on the reflectal spectrophotometric characteristics of raw and cooked, normal and green meat. These have led to the conclusion that the pigment involved is a heme protein, probably myoglobin. Raw meat which will turn green on cooking seems to have unusual quantities of the ferric oxidized form, metmyoglobin. On cooking, denaturation of the globin produces relatively more of the reduced form, hemochrome, than the nonreduced form, hemichrome, in green as compared with normal tuna meat. It is the relative quantities of these two denatured globins, with different spectral reflectances which determine whether the meat will appear green or normal. Some evidence also exists for a low concentration of additional pigments in cooked green meat, which may be unusual hemior myoglobin derivatives. Both browning and greening seem to be manifestations of oxidation of the heme protein pigments.



1956 PACK 25 PERCENT HIGHER THAN IN 1955: Red salmon, coming back to their spawning grounds in numbers reminiscent of other days, spearheaded the 1956 Alaska salmon pack to an increase of more than 25 percent over that of 1955.

Tabl	e 1 - Alasi	ka's Canne	d Salmon	Pack by Sp	ecies and	Area, 195	5-56	
		1/ 195	6		1955			
Species	South- eastern	Central	Western		South- eastern		Western	Total
			(Standar	d Cases of	48 1-Lb.	Cans)		
King	1,272	21,212	23,767	46,251	1,157	22,078	24,583	47,818
Red	72,851	341,030	579,761	993,642	55,561	233,290	332,793	621,644
Pink	634,272	516,140	3,918	1,154,330	540,495	696,880	90	1,237,465
Chum	294,282	365,088	32,197	691,567	177,667	162,999	22,968	363,634
Silver or Coho	46,497	49,015	4,388	99,900	64,814	47,294	2,476	114,584
Total	1,049,174	1,292,485	644,031	2,985,690	839,694	1,162,541	382,910	2,385,145
1/ Preliminary data.								

Preliminary figures indicate a 1956 pack of 2,986,030 standard cases (48 1-lb. cans), or 600,000 cases above the 1955 total, and not far behind the 3,094,452 cases of 1954. While the pack is still below the long-term average, the trend which has been generally down since 1943 appears to have been arrested by the conservation measures which are now in effect.

Pink salmon still have "to turn the corner," but U. S. Fish and Wildlife Service officials report that current conservation practices, especially in Prince William Sound and southeastern Alaska, demonstrated their effectiveness in 1956.

One very encouraging aspect of the 1956 run is that escapement of both red and pink salmon to the spawning grounds in most areas was well above the average of recent years, a fact which portends well for the fisheries of future years. The total red salmon run in the Naknek-Kvichak section of Bristol Bay was approximately 15 million fish, of which 11 million avoided the nets and kept on toward the

spawning grounds. Heavy escapements of red salmon are reported in the Nelson Lagoon and Sandy Lake and other places along the Peninsula. Chignik experienced a good escapement of red salmon and in Cook Inlet the escapement is reported to have exceeded anything achieved in recent years; that of Prince William Sound pink salmon was reported excellent, while escapement of that species in southeastern Alaska is listed as good to excellent.

Since the life cycle of the salmon varies from two years with the pinks to four to six years with the reds, results of the 1956 escapements will be reflected in the runs of 1958 and later years.

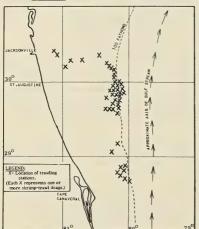
Little is known of that part of the salmon's life spent at sea but biological studies are being made on this phase of its life history at the present time. The pink salmon caught this year were smaller than average, going 22 to 25 to the case instead of the usual 17 or 18.

Conservation measures being practiced at the present time include provisions for adequate escapement, better protection of the spawning beds, reduction of predators, stream clearance, etc. Biological research includes: numerous studies on depredation and other natural factors which affect the salmon from the time the mature fish reach the spawning beds until the young ones begin their life in the ocean. In addition, there are now oceanographic and biological studies to determine what conditions effect salmon at sea.



South Atlantic Exploratory Fishery Program

FLORIDA EAST COAST SURVEY FOR ROYAL-RED SHRIMP CONTINUED (M/V Combat Cruise 5): Additional production-type dragging for royal-red shrimp



M/V Combat September 1956 trip.

was carried out by the U.S. Fish and Wildlife Service-chartered shrimp trawler M/V Combat in 160-200 fathoms off St. Augustine, Fla., during August and September 1956. Nineteen drags made with 40-foot and 56-foot flat trawls during August 17-22 yielded a total of 3,305 pounds of heads-on royal-red shrimp (25-count headed). Individual catches ranged from 60-360 pounds and averaged approximately 170 pounds of shrimp a 3to 5-hour drag. Lower catch rates were obtained in the same area between September 14-19 when 20 drags caught a total of 2,321 pounds of heads-on royal-red shrimp, averaging 115 pounds a drag. During the latter trip, seven drags were made south of the St. Augustine grounds in depths of 150 to 225 fathoms. Catches ranged from 40 to 80 pounds of royal-red shrimp a drag, with equal amounts of 21-25 count and 61-70 count heads-off shrimp in each successful drag.

A commercial shrimp vessel, the M/V Northeaster, working with the Serv-

ice-chartered M/V Combat during the mid-September trip, landed approximately 1,800 pounds of headed royal-red shrimp.

The August 30-September 4 period was devoted to additional shallow-water exploration along the Florida coast north of Cape Canaveral. A total of 26 drags were made in depths of 13-18 fathoms and 5 in 100-150 fathoms, using 40-foot flat trawls and a 10-foot beam trawl. Although several isolated trawling areas were located, the bottom was found to be mostly coral and generally untrawlable out to the edge of the continental shelf. Drags in 22 to 23 fathoms using a 40-foot trawl caught large rock shrimp (Sicyonia brevirostris), at rates of 90 to 150 pounds an hour during night fishing.

While fishing at night during this period, several large schools of sardines (Sardinella anchovia) were observed and picked up on the depth recorders between the 10- and 40-fathom curves. Samples were obtained using a dip net.



U. S. Fish Catch May Set All-Time Record in 1956

United States fishermen in Alaska may catch more than 5 billion pounds of fish in 1956 and set an all-time national record unless some unforeseen circumstance intervenes, Secretary of the Interior Fred A. Seaton announced on November 5, 1956.

U. S. Fish and Wildlife Service records indicate that about 70 percent of a year's catch is landed by September 1 and that this year the total landings are running nearly half a billion pounds ahead of those of last year and well ahead of the catch on September 1, 1941 -- the record year. Even if the catch in the final quarter is only normal the record will be broken, the Secretary explained.

In 1955 the total American catch was 4.9 billion pounds, which is the present record year.

Menhaden, a fish used primarily for oil and meal and usually comprising about 40 percent of the catch, is setting the pace with an increase of 200 million pounds. Other species which have been taken in considerably greater quantity than in 1955 are: tuna, up 60 million pounds; Alaska salmon, up 50 million; Alaska herring, up 39 million; California sardine, up 28 million; Maine sardine, up 26 million; Pacific jack mackerel, up 23 million; Pacific mackerel, up 9 million; ocean perch, up 6 million; haddock, up 10 million; halibut, up 7 million.

The ex-vessel value for the 1955 catch was \$325 million. Prices are somewhat better this year, which together with the larger catch indicates an increase in the ex-vessel value of the catch.

United States Fishing Fleet ¹/_{Additions}

OCTOBER 1956: A total of 49 fishing ves- Table 1 - Vessels Issued First sels of 5 net tons and over were issued first documents as fishing craft during October 1956, according to the U.S. Fish and Wildlife Service. This was 8 vessels more than the number reported for the same month last year.

A total of 454 fishing vessels was documented for the first time during the first 1/Includes both commercial fishing and sport fishing craft.

Table 1 Vessels issi	ieu rirst	ı				
Documents as Fishing Craft,						
by Tonnage, October	1956					
Net Tons	Number					
5 to 9	29					
10 to 19	9					
20 to 29	3					
30 to 39	8					
Total	40					

Table 2 - U. S. Vessels Issued First Documents as Fishing Craft, by Areas, October 1956 and Comparisons								
Area October Jan. Oct. T								
Area	1956		1956		1955			
		(1	Jumber)				
New England	1	1	14	17	18			
Middle Atlantic	2	1	23	12	13			
Chesapeake	22	10	109	44	54			
South Atlantic	14	11	106	61	65			
Gulf	6	15	89	92	103			
Pacific	3	3	71	110	117			
Great Lakes	-	-	2	7	9			
Alaska	1	-	40	31	35			
Hawaii	-	-	-	3	3			
Virgin Islands	-	-	-	-	1			
Total	49	41	454	377	418			
Note: Vessels assigned to the various see	ctions on	the basis	of their ho	me port.				

ten months of 1956--an increase of 77 craft (20 percent) more than the number reported for the corresponding period of last year. During the ten-month period of 1956, the Chesapeake led all other areas with 109 newly-documented vessels, followed by the South Atlantic area with 109.



U.S. Foreign Trade

EDIBLE FISHERY PRODUCTS, AUGUST 1956: Imports of edible fresh, frozen, and processed fish and shellfish in August increased 5 percent in quantity and

Table 1 - United States Foreign Trade in Edible Fishery Products, August 1956 With Comparisons								
	Q	uantity			Value			
Item	A	ug.	Year	Au	g.	Year		
	1956	1955	1955	1956	1955	1955		
	(Millie	ons of I	Lbs.)	(Mill	ions o	f \$)		
Fish & Shellfish:								
Fresh, frozen, & processed 1/	74.6	71.1	769.9	22.3	18.6	206.4		
Exports:								
Fish & Shellfish:								
Processed 1/ only (excluding								
fresh and frozen)	4.8	5.8	91.0	1.1	1.6	21.6		
1/ Includes pastes, sauces, clam chowder and juice, and other spe	cialties.							

1.8 percent in value as compared with July 1956. Compared with August 1955 the imports for August 1956 were higher by 5 percent in quantity and 20.0 percent in value. August 1956 imports averaged 29.9 cents a pound as dompared with 26.2 cents a pound for the same month in 1955 because of the higher prices prevailing for many imported fishery products, particularly shrimp and spiny lobster tails.

Exports of edible processed fish and shellfish in August decreased 19 percent in quantity and 15 percent in value as compared with August 1956. Compared with August 1955 the imports for August 1956 were also lower by 17 percent in quantity and 31 percent in value.

* * * *

GROUNDFISH FILLETS IMPORTS REACH RECORD HIGH IN OCTOBER 1956: A total of 25.7 million pounds of cod, haddock, hake, pollock, and ocean perch fillets, including fish blocks, were imported into the United States during October 1956-the highest ever recorded for any one month. This was an increase of 8.8 million pounds or 52 percent as compared with the same month of 1955. The increase was due primarily to increased imports from Canada (up 5.0 million pounds)

and from Iceland (up 3.1 million pounds). Imports from Norway and Denmark also were somewhat larger, while receipts from the Netherlands and West Germany were less than in October 1955.

Groundfish and ocean perch fillets imported from Canada during October 1956 amounted to 17.2 million pounds --67 percent of the total; Iceland accounted for 25 percent; and the remaining 8 percent came from Norway, Denmark, the United Kingdom, the Netherlands, France, West Germany, and Greenland.

Eleven countries exported 128.7 million pounds of groundfish and ocean perch fillets (including blocks and slabs) to the United States during the first 10 months of 1956, while twelve countries exported 114.6 million pounds of these products during the corresponding period of 1955. Canada (91.4 million pounds) led all other countries in exports of these items to the United States with 71 percent of the 10-month total. Iceland (26.6 million pounds) was in second place, followed by Norway (3.9 million pounds), Denmark (2.9 million pounds), and West Germany (1.9 million pounds).

Note: See Chart 7 in this issue.

* * * * *

TUNA CANNED IN BRINE IMPORTS UNDER QUOTA PROVISO: The quantity of tuna canned in brine which may be imported into the United States during April 16 through December 31, 1956, at the $12\frac{1}{2}$ -percent rate of duty is limited to 28,757,393 pounds. Any imports in excess of that quantity will be dutiable at 25 percent ad valorem.

Imports under the quota from April 16-November 3, 1956, amounted to 22,489,317 pounds, according to data compiled by the Bureau of the Customs. This leaves a balance of 6,268,076 pounds of the quota which may be imported in the last two months of 1956 at the $12\frac{1}{5}$ percent rate of duty.



Wholesale Prices, October 1956

The major United States fisheries in October were entering a period of low yield-the West Coast halibut season ended; the season for canning salmon was about over; the canning season for Maine sardines continued, but at a low level; and the yield for some fresh-water fish was poor. On the other hand, the tuna catch continued at a high level; the New England haddock fishery was normal; Gulf shrimp production was good, but not up to expectations; and oyster harvesting was entering the period of peak production, but with indications of a below-average season. October 1956 wholesale prices were down slightly from September 1956, but were still higher than for the same month in 1955. The October 1956 wholesale index (112.5 percent of the 1947-49 average) for all edible fresh, frozen, and canned fish and shellfish declined about 1.6 percent from September, but was higher by 4.7 percent than for October 1955.

The leading finfish from a production standpoint in the drawn, dressed, and whole finfish subgroup were haddock and yellow pike, all the other varieties—salm—on, halibut, lake trout, and whitefish—were relatively scarce in the fresh fish markets. This supply situation was reflected in the mixed trends in this subgroup with the net result that from September to October 1956 the subgroup index dropped 7.6 percent. When compared with October 1955, the October 1956 index for this subgroup was higher by 6 percent. Prices for most of the seven fish products in the drawn, dressed, and whole finfish subgroup were higher in October 1956 than in the same month in 1955.

The October 1956 index for the fresh processed fish and shellfish subgroup was only 0.7 percent lower than for the preceding month and higher by 15.2 percent than in October 1955. Higher prices in October 1956 for fresh headless shrimp at New York and fresh shucked oysters offset the lower prices for Boston haddock fillets.

Group, Subgroup, and Item Specification	Point of Pricing	Unit	Avg. I	Prices1/		Indexes (1947-49=100)		
			Oct. 1956	Sept. 1956	Oct. 1956	Sept. 1956	Aug. 1956	Sept 1955
L FISH & SHELLFISH (Fresh, Frozen, & Canned)					112,5	114.3	114.6	107.
Fresh & Frozen Fishery Products:					122,0	125,8	126,5	110.
Drawn, Dressed, or Whole Finfish:					122.5	132,6	131.2	115.
Haddock, Ige., offshore, drawn, fresh		1b.	.07	.10	67.4	100.1	101.3	106.
Halibut, West., 20/80 lbs., drsd., fresh or froz.	New York	1b.	.43	.45	135.5	139,2	136,9	99.
Salmon, king, lge. & med., drsd., fresh or froz.	New York	1b.	.67	.68	150.6	151.7	148,3	135.
Whitefish,L. Superior, drawn, fresh	Chicago	lb.	.75	.61	185.9	151.2	121.5	161.
Whitefish, L. Erie pound or gill net, rnd., fresh .	New York	lb.	.80	.74	161.8	149.6	131.4	161.
Lake trout, domestic, No. 1, drawn, fresh	Chicago	lb.	.75	.58	153,6	117.8	122.9	116. 75.
Yellow pike, L. Michigan & Huron, rnd., fresh .	New York	lb.	.36	.50	83,3	117.3	129.0	19.
Processed, Fresh (Fish & Shellfish):					125.4	126.3	122.2	108.
Fillets, haddock, sml., skins on, 20-lb. tins	Boston	1b.	.27	.29	91.9	97.0	97.0	102.
Shrimp, lge. (26-30 count), headless, fresh	New York	1b.	.71	.72	112,2	113.0	110.2	87.
Oysters, shucked, standards	Norfolk	gal.	6,00	6,00	148.5	148,5	142.3	136.
Processed, Frozen (Fish & Shellfish):					106,2	102.9	114,5	93,
Fillets: Flounder, skinless, 1-lb. pkg	Boston	1b.	.39	.40	102.1	103.4	103,4	102.
Haddock, sml., skins on, 1-lb. pkg	Boston	1b.	.28	.28	86,3	86.3	86,3	84,
Ocean perch, skins on, 1-lb. pkg	Boston	1b.	.27	.28	108.8	110.8	110.8	106.
Shrimp, Ige. (26-30 count), 5-1b. pkg	Chicago	lb.	.69	.64	105.7	99,2	120.4	83,
Canned Fishery Products:					99.0	98,0	97.7	103.
Salmon, pink, No.1 tall (16 oz.), 48 cans/cs Tuna, lt, meat, chunk, No. 1/2 tuna (6-1/2 oz.),	Seattle	cs.	22,65	22,65	122.0	120.0	120.0	114.
48 cans/cs. Sardines, Calif., tom, pack, No. 1 oval (15 oz.)	Los Angeles	cs.	10.85	10,60	78.2	76.4	76.4	92
48 cans/cs	Los Angeles	cs.	7,75	7.50	90.4	87.5	87.5	88
Sardines, Maine, keyless oil, No. 1/4 drawn (3-1/4 oz.), 100 cans/cs.	New York	cs.	7.70	7,70	81.9	81.9	79.8	87.

1/Represent average prices for one day (Monday or Tuesday) during the week in which the 15th of the month occurs,
These prices are published as indicators of movement and not necessarily absolute level. Daily Market News Service
"Fishery Products Reports" should be referred to for actual prices.

Wholesale prices for fresh shrimp at New York City were up about 9 percent from October 1955 to October 1956, but haddock fillet prices at Boston were down 10 percent over the same period.

Wholesale prices for processed frozen shrimp in October were directly opposite to the seasonal trend. As a rule frozen shrimp prices drop in the fall months, but this October they rose because of (1) below-normal landings in the Gulf, (2) relatively low stocks, and (3) the steady demand for this commodity during periods of high wage levels. Frozen fillet prices in October 1956 were down slightly from the previous month, but still were higher than for October 1955. The frozen processed fish and shellfish subgroup index for October 1956 was 3.2 percent above the previous month and 12.1 percent above the same month in 1955.

The index for the canned fish subgroup continued to show signs of firmness in October 1956 when compared with both September and August 1956. Although still below the October 1955 index by 4.3 percent, the price gap between the two years

is closing. The drop in canned tuna prices was reversed with an increase in October of 25 cents a case for the chunk-style light-meat pack. Although the California sardine fishing season was off to a good start, early indications of a fair season did not continue up to the end of October and as a result canned California sardine (pilchard) prices moved upward. The marketing situation for all canned fish was very healthy at the end of October 1956.



NOW IS THE TIME FOR OYSTER STEW

Now is the time to serve a tempting bowl of steaming hot oyster stew. This dish will have special appeal to all and it is so easy to prepare.



Oysters are entirely edible and there is no waste from trimmings. And nutritionally speaking, they are wonderful! An average serving of six oysters will supply more than the daily allowance of iron and copper, about one-half the iodine, and about one-tenth of the needed protein, calcium, magnesium, phosphorus, vitamin A, thiamine, riboflavin, and niacin. To retain the delicate, distinctive flavor of oysters, never cook them too long, just enough to heat them through and leave them plump and tender.

Oyster stew served in a large bowl accompanied by crisp crackers, a jellied fruit salad, and a home baked cake will form the basis for an attractive, delectable, nutritious meal. Here is a recipe for "Oyster Stew" as recommended by the home economists of the U.S. Fish and Wildlife Service to serve your family on chilly days.

OYSTER STEW

1 PINT OYSTERS

 $1\frac{1}{2}$ TEASPOONS SALT

1 CUP BUTTER OR MARGARINE, MELTED

DASH PEPPER

1 QUART MILK

PAPRIKA

DRAIN OYSTERS, ADD OYSTERS TO BUTTER AND COOK FOR 3 MINUTES OR UNTIL EDGES CURL, ADD MILK, SALT, AND PEP-PR, AND BRING ALMOST TO BOILING POINT. GARNISH WITH PAPRIKA, SERVES 6.



International

AIR CARGO PERISHABLE FOODS PACKAGES TO HAVE DISTINCTIVE LABEL

New symbolic labels are appearing on various types of international air cargo packages, according to the International Air Transport Association (IATA).

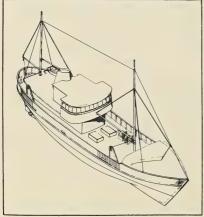
Each of the new labels is designed to convey its message at a glance. The "Perishable Goods" label is wordless, except that the name of the airplane employing it appears below the diagram.

The perishable goods label exhibits a completely new approach to the problem of symbolizing on a package such commodities as meat, fish, fruit or flowers. The illustration shows a carcass of beef, a cluster of grapes, a fish, and a flower, in four separate diagrams surrounding the outline of an hourglass. The symbols are in blue on a white background.

The result of studies by cargo and traffic experts of IATA's traffic handling and accountancy working group, the labels have minimum dimensions, 4 inches wide by 6 inches high.

FOOD AND AGRICULTURE ORGANIZATION

FISHERY RESEARCH VESSELS DESIGNED BY FAO NAVAL ARCHITECTS: Outline plans and specifications for a 90-foot fishing gear research vessel, which



Line drawing of proposed Swedish fishery research vessel prepared by Naval Architects of FAO.

will cost about US\$240,000, have been prepared by naval architects of the Food and Agriculture Organization Rome, for the Government of Sweden.

These drawings, which have been prepared after special study of the requirements of a gear research vessel, will provide the base from which Swedish naval architects will make final working drawings.

"This is one of many research vessels which we have advised or worked on recently," said Jan Olof Traung, Chief, Fishing Boat Section, Technology Branch, Fisheries Division, FAO. The Government of South Africa is now considering building three fishery research vessels at a total cost of about US\$490,000 and have requested FAO to advise them on layout, design, and specifications. The vessels concerned are two of 75 feet and one of 100 feet.

FAO plans for the Swedish fishery research vessel call for wooden construction

but a modified hull shape which will give higher speed and make for a more "seakindly" vessel.

"We hope that this vessel, when built, will provide a useful example in design for Swedish fishermen," stated Traung. "We have given the boat a sharper entrance, fuller midships section, and a fuller run, and I think its performance will encourage Swedish fishermen to adopt this type of design."

An unusual feature of the vessel is an alleyway which runs through the center of the large fish hold. This will enable the crew and the scientists on board to walk from one end of the ship to the other under cover and will permit separate experiments to be conducted in each half of the fish hold, especially in connection with the use of antibiotics to preserve fish. Another feature is that the trawl winch is hydraulically driven and has therefore been placed forward on the port side, which was considered best from the fishing point of view.

While research vessels are essential for development and progress in fisheries, the cost is very heavy as compared, for example, with the cost for constructing laboratories ashore.

"We know that a great many countries are interested in building fishery research vessels," said Traung, "and a good deal of thought should be given to the actual boat requirements within their research programs. Research vessels have to be built for specific purposes, such as gear research or biology, fundamental or applied. If the work to be done is exactly defined then it might be possible to use smaller ships to better advantage. For example, two 90-foot vessels might be more efficient and useful in fishery research than one of 120 feet and yet cost no more.

"We are investigating this situation at FAO and we are preparing preliminary plans and specifications for 12 fishery research vessels, three each of 30 feet, 50 feet, 70 feet, and 90 feet, respectively," he stated. "When we have these outline designs ready, they will form a kind of catalogue of research vessels which will enable us to show governments what can be achieved with such smaller ships."

INTERNATIONAL COUNCIL FOR EXPLORATION OF THE SEA

INTERNATIONAL COOPERATION RECOMMENDED TO CONSERVE NORTH SEA HERRING STOCK: The International Council for the Exploration of the Sea during its annual meeting at Copenhagen, that ended on October 9, 1956, expressed concern over the herring stocks in the southern part of the North Sea. Exports from 15 countries, encluding Russia, who attended the meeting, now have a clearer picture, as a result of research, of the status of North Sea herring stocks.

A committee passed a resolution urging all interested countries to cooperate in a coordinated program designed to determine factors affecting the yield from North Sea herring fisheries.

The committee said herring seem to be changing their migration patterns. Some experts think the large number of young herring caught by Danish and German fishermen is reducing the English fishery off Yarmouth and Lowestoft. There was urgent need for intensification of the tagging program, under which about one-million herring have been marked by nylon, wire, or pellets over the past eight years.

Prof. H. U. Sverdrup, of Norway, president of the council, said the results might indicate that the herring fishery should be limited, but this need not mean that yields had to fall--only that stocks should be fished in a more rational way.

The investigating committee recommended that international cooperation could best be started by an intensive tagging program on the Bloeden ground, beginning in August 1957. (The Fishing News, October 12, 1956.)

Reduced herring catches in the North Sea are due, not to overfishing, but to changes in the migration of the herring, according to the fishery experts who attended the annual meeting.

Dr. Arni Fridriksson, secretary-general of the Council, said distribution of herring depended on such factors as availability of food, ocean currents, water salinity, and temperature.

In his own studies of the North Iceland herring fishery, which has failed for the past 11 years, he found that the most important reason seemed to be a change in ocean currents which had become too strong to take the herring together with the food on which they live, to the North Sea. These in turn were connected with changes towards a milder climate.

The herring which were deserting their normal fishing banks were possibly either not concentrating in such large shoals, or were frequenting other banks which were unknown, he said.

As yet, however, there was inadequate evidence to put forward any satisfactory scientific explanations, said Dr. Fridriksson.

INTERNATIONAL NORTH PACIFIC FISHERIES COMMISSION

FIVE MONTH SURVEY OF NORTH PACIFIC SALMON STOCKS COMPLETED: A five-month study by Canadian, Japanese, and United States biologists to discover the salmon's North Pacific Ocean habitats and whether or not United States and Canadian salmon overlap with Asiatic salmon was completed in October 1956. The survey was made by the chartered fishing vessels Challenger and Key West II.

During the course of the survey mile-long gill nets with four different mesh sizes were set between 42° and 58° north latitude and as far west as longitude 150° . The vessels were equipped with freezing systems for preserving the catch for further study at Canada's Biological Station at Nanaimo, B. C. Scientists collected water temperatures, water samples down to 150 fathoms, plankton, and other oceanographic data. Fish were caught at all stations. The two vessels traveled 16,000 miles during their investigations.

INTERNATIONAL PACIFIC SALMON CONFERENCE

CANADA-UNITED STATES AGREEMENT ON PINK SALMON CONSERVATION: Agreement was reached today by Canadian and United States delegates at a Conference called to work out means for coordinating national and joint conservation programs for pink and sockeye salmon of common concern in the Juan de Fuca-Fraser River area of the Pacific Coast. The Conference agreed that this objective might best be achieved by expanding the authority of the International Pacific Salmon Fisheries Commission, by amendment of the Sockeye Salmon Convention of 1930, thus permitting the Commission to investigate the pink salmon stocks of the Fraser River and regulate the fishery.

The Commission's objective would be to maintain the pink salmon stocks at the level of maximum sustainable productivity and to insure insofar as practicable an equal division of the catch of pinks by Canadian and United States fishermen. The agreement provides that the Commission may begin regulation of the fishery immediately after entering into force.

The International Pacific Salmon Fisheries Commission which was established in 1937 consists of three representatives each from Canada and the United States. It has had responsibility for the investigation and management of the sockeye salmon of the Fraser River system, states an October 25, 1956, news release from Canada's Department of Fisheries in Ottawa.

The agreement will provide for division of the catch and will increase the size of the Commission's Advisory Committee by adding one member from each country in order to give broader representation from the industry.

The agreement also provides for a coordinated investigation by research agencies of the two governments and the commission of pink salmon stocks which enter the waters described in the convention. It calls for a meeting in the seventh year after entry into force to review the results of this investigation and to determine what future arrangements concerning pink salmon conservation might be desirable. The agreement has been referred to the two governments for signature.

The conference also took note of the serious threat which offshore net fishing poses to the conservation of both pink and sockeye salmon stocks and adopted a resolution calling this matter to the attention of the governments and recommending immediate action on their parts to solve the problem.

The conference opened under the chairmanship of George R. Clark, Deputy Minister of Fisheries of Canada and head of the Canadian delegation. Vice-chairman was W. C. Herrington of the Department of State, Washington, D. C., who headed the United States delegation. Representatives of the governments of both countries, the Department of Fisheries of the State of Washington, and of fishermen, fish processors, and vessel owners from the State of Washington and British Columbia took part in the discussions.

AGREEMENTS

SOVIET-IRAN FISHERIES AGREEMENT: Iran and the U.S.S.R. signed a fish eries agreement (covering the period March 1956 to March 1957) on June 5, 1956, providing for the sale to Russia of about 46 metric tons of caviar, 500 metric tons of sturgeon, and 700 metric tons of other types of Caspian Sea fish. The agreement, which is valued at about \$797,000, differs only slightly from the previous year's. First deliveries under the agreement will come from catches of the 1956 fishing season which began in September 1956. The Iranian-Soviet barter trade agreement for 1956/57, to which the fisheries agreement is related, provides a maximum quota of about \$855,000 in fish and fish products for export to the U.S.S.R.

The amount of caviar, sturgeon, and miscellaneous other fish which is to be sold to the Soviet Union is the same as that agreed upon last year, but prices have been increased in two instances: first-grade beluga caviar has risen from US\$18 to US\$20 a kilogram (\$8.16 to \$9.07 a pound), and sturgeon is quoted at US\$336 a metric ton instead of US\$317. Following are the quantities, grades, and prices of caviar to be sold:

Metric	Caviar Type	US\$ Per
Tons	and Grade	Pound
3	Beluga, 1st	9.07
7	Ossatrina, 1st	8.16
1	Ossatrina, 2nd	4.08
15	Sevruga, 1st	5.73
8	Sevruga, 2nd	2.86
8	Pressed, 1st	2.61
4	Pressed, 2nd	1.96

The sale of about \$497,580 in assorted grades of caviar is thus foreseen by the agreement, states an October 5, 1956, despatch from the United States Embassy in Tehran. The 500 metric tons of sturgeon are valued at about \$168,000, while the third category of about 700 metric tons of miscellaneous Caspian Sea fish may come to about \$131,000. These prices include delivery from the Iranian port of Bandar Pahlevi on the Caspian to the Soviet port of Baku. If sufficient Iranian shipping is not available,

the U.S. S. R. is obligated under the agreement to furnish the necessary transportation for what was described by the managing director of the National Iranian Fisheries Company as a "very small" fee. It is moreover anticipated that the U.S.S. R. will have to furnish most of the transportation this year. During the life of the contract for 1955/56, the U.S.S.R. took the entire amount allocated in the agreement. The same is expected this year, with the possibility, according to a fisheries official, that more than the allotted 700 metric tons of miscellaneous fish will be taken.

This fisheries agreement is made within the frame of the Iran-U, S, S, R, barter agreement, signed September 5, 1956, for the period April 1, 1956-March 31, 1957. The maximum export quota for Iranian fish and fish products under the barter agreement is 65,000,000 rials (about US\$855,000). The quota amount the previous year was 60,000,000 rials (US\$789,000). Fishing equipment from the U, S, S. R. will partly offset the value of Iranian fisheries products. The maximum quota set for Soviet fishing equipment and nets under the barter agreement is 15,000,000 rials or about US\$144,000, the same as last year. It is believed that the equipment will include, in addition to nets, fishing boat gear, fish processing chemicals, and tins for fish canning.

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SOVIET-JAPANESE PEACE AGREEMENT ACTIVATES FISHING TREATY: Japan and the Soviet Union on October 19, 1956, in Moscow, signed an agreement to end 11 years of a state of war between them. While the agreement was not a formal treaty of peace, it was a resumption of diplomatic relations and settled most of the problems that had existed between the two countries since World War II with the exception of territorial problems.

One result of this action was to make effective the Japanese-Russian treaty of May 14, 1956, regarding fishing in the Northwest Pacific. Essentially, the May 14 treaty establishes a joint Russian-Japanese commission to review operation of the pack, set annual catch limits, and recommend measures to conserve and increase the marine resources of the contested area.

Included in the texts of of the Joint Declaration by Japan and the Union of Soviet Socialist Republics included these paragraphs regarding fisheries:

8. The Convention between Japan and the Union of Soviet Socialist Republics concerning the Fisheries in the High Seas of the Northwest Pacific Ocean and the Agreement between Japan and the Union of Soviet Socialist Republics concerning Cooperation for the Rescue of Persons in Distress at Sea, which were signed in Moscow on May 14, 1956, shall become effective simultaneously with the entry into force of the present Declaration.

Japan and the Union of Soviet Socialist Republics shall in a spirit of cooperation take measures for the conservation and development of fishery resources as well as for the regulation and restriction of fishing in the high seas, taking into consideration the interests of Japan and the Union of Soviet Socialist Republics with regard to the conservation and rational utilization of the fish and other living resources of the sea.

WHALING

EXPEDITIONS FOR 1956/57: During the 1956/57 Antartic whaling season, 20 expeditions will participate as compared with the 19 that took part in the 1955/56 season. The additional expedition will be from Japan, making a total of five from that nation. Norway will have 9 expeditions and the balance will come from England, South Africa, Russia, and the Netherlands.

The 20 factory whaling ships and three shore stations will use 35 fewer catcher boats, 243 as compared with 278 in 1955/56. This is in accord with the agreement

made by the whaling companies at the suggestion of the Norwegians in an effort to reduce costs (The Fishing News, October 12, 1956).

This season the catch is to be limited to 14,500 blue-whale units--one blue whale (the largest species, growing up to 100 feet long) equals two fin (the next largest) or $2\frac{1}{2}$ humpback, or six sei. Last season the limit was 15,000 units.

There are many other restrictions, of which the main two are:

The season as a whole lasts only from January 7 to April 7, and is ended earlier if the catch limit is reached before the closing date. There is no extension if the limit is not reached. Blue whales can only be killed from February 1, and only four days are allowed for humpbacks.

Blue whales must not be killed under 70 feet long, fin whales 55 feet, sei whales 40 feet, and humpback 35 feet.

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JOINT JAPANESE-CHILEAN WHALING VENTURE PLANNED. A joint whaling company has been planned by a leading Japanese fishing firm and a newly incorporated Chilean firm. Under the plan the proposed company will have a capital of US\$1.2 million, which will be shared equally by the participating companies. The Japanese will provide two whaling catcher boats with crews of forty men. They also will furnish 16 technicians to operate the proposed plant which will be located at Coronel Bay, near Concepcion, in Chile.

The Japanese Ministry of Foreign Affairs had earlier opposed the agreement on the grounds that the firm would not be subject to the provisions and restrictions on whaling imposed by the International Whaling Commission since it will be organized under Chilean Law. Chile is not a member, but Japan is a member of the Commission and is bound to abide by its rules. The Ministry withdrew its objections recently on receipt of assurance from the Japanese and Chilean firms that the new company will observe the International Whaling Commission's regulations. Officials of the Japanese firm in Tokyo have stated that with the withdrawal of the Ministry of Foreign Affairs objections the agreement will be approved by the Japanese Government. They also state that Chilean Government approval of the arrangement is imminent, states an October 12, 1956, dispatch from the United States Embassy in Tokyo.

The Japanese fishing industry attaches considerable importance to this venture since it is the largest of its kind ever attempted by a Japanese fishing firm and the industry hopes that it will set a pattern for such arrangements in other countries which would relieve the pressures on Japanese coastal fishing and whaling.



Argentine Republic

CANNED SARDINE MARKET: Argentine produces an "Argentine sardine" from a local catch of anchovitas (Clupea or Engraulis encrasicholus). In 1955, there were landings of 336,419 boxes (averaging 40 kilograms or 88 pounds each in weight) of fresh anchovita. Of this quantity, 190,271 boxes went to the sardine canneries.

The leading canner calculates 1955 output of canned Argentine sardines at approximately 500,000 cases--100 cans to a case for cans of 115-170 grams (4-6 oz.); 50 cans to a case for cans of 220 grams (about 8 oz.) and up. The bulk is packed in vegetable oil and a few in olive oil, and tomato sauce.

Domestic production of canned Argentine sardines adequately covers local requirements and can readily be increased, an October 22 dispatch from the United States Embassy at Buenos Aires states. From the 1955 production, industry carried over a stock of 10 percent or more. The long-range consumption trend is upward, but at the moment sales have declined because of relative higher price increases for canned goods since the October 1955 devaluation.

Table 1 - Argentine Packers' Prices for Canned Sardines to Retail Distributors, October 15, 1956									
		etable Oil		ve Oil					
	Pesos	U.S. Cents							
115-120 grams (4-5 oz.)	2.78	16	3.95	22					
170-180 grams (6-7 oz.)	3.55	20	4.95	28					
220 grams (about 8 oz.)	4.70	26	6.50	36					

For wholesalers, the packer grants a discount varying from 10 to 15 percent.

Imports of canned sardines are not authorized by Argentina.



PEARL SHELL BEDS TO BE SURVEYED: The Australian Minister for Primary Industry announced that it has become necessary to establish the condition of the pearl-shell beds located off Northern Australia after years of pearling operations by Australian and Japanese fleets. The results of the survey will provide a guide to future pearling activities. The survey will be carried out by the Commonwealth Fisheries Division of the Department of Primary Industry in collaboration with the Commonwealth Scientific and Industrial Research Organization, and is expected to take about six months.

The Japanese pearling and fishing operations carried out off Australia have long been a most controversial subject in Australia and annual agreements regulate the areas to be fished and the amounts of pearl to be taken by the Japanese. Australia claims the right to control pearl fishing in the relatively shallow waters of the continental shelf located off the northern coast. This claim is the subject of an Australian-Japanese dispute which may be brought before the International Court of Justice, states an October 22, 1956, dispatch from the United States Embassy in Canberra.

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SCALLOP RESOURCE FOUND OFF QUEENSLAND: Scallops have been found in great numbers along some parts of the Queensland coast of Australia, reports the Australian Department of the Interior.

The Queensland scallop is similar in size and appearance to the Japanese variety. The upper shell is a dark golden color and the lower is pale like the color of a full moon. For that reason it is sometimes referred to as the "sun and moon" fish.

Until recently, the only commercially-established scallop beds have been in the coastal waters of the State of Tasmania, although these shellfish were known to exist around the southern Australian coastline from New South Wales to Western Australia.

But in 1954, shoals of scallops were discovered in Queensland. A fisherman trawling for shrimp brought to light quantities of scallops in Platypus Bay, near

Bundaberg. The following year another fisherman operating with an echo-sounder found appreciable quantities of scallops in Hervey Bay and picked up two tons in 10 minutes.

Since then a Hervey Bay trawling company apart from helping to supply Queensland shrimp to newly-established markets in the United States, New Zealand, and the United Kingdom, has concentrated on exploring the possibilities of establishing a market for Queensland scallops both locally and overseas.

The Queensland Scallop, which averages six inches in diameter, is much larger than its Tasmanian cousin. The first experimental trawling undertaken by the Hervey Bay company in April 1956 resulted in a catch of 20 tons (in the shell) of scallops in six trips. Since then the scallop fishing has been intensified to increase the supply of scallops for an expanding local market.

And now that the first order for 7,200 pounds from the United States has been followed by a second of 37,100 pounds, it seems inevitable that scallops will take their place beside shrimp as Queensland's newest export industry.

Scallops are caught by draggers in much the same way as shrimp. Their natural enemy is the starfish and with every net full of scallops hauled aboard the trawler there is invariably a large following of starfish.

The scallop meats are packed in transparent plastic bags, packaged in attractive cartons, and deep-frozen ready for delivery to home and overseas markets.

From the point of view of the fishermen who man the 80-odd trawlers operating from Bundaberg, the scallop promises to bring stabilization to the fishing industry for unlike shrimp which disappear from about October until May, scallops are found all year round.



Bahama Islands

SPONGE BEDS TO BE OPENED APRIL-JUNE 1957: The Agricultural and Marine Board of the Bahama Islands announced early in October that it plans to open the sponge beds in the Bahamas from April 1 to June 30, 1957. The Board was reported to be looking for a large shed near the harbor of Nassau which can be used as a market, states an October 5 dispatch from the United States Consul in Nassau.



Belgium

CANNED SARDINE MARKET: The domestic pack of canned sardines or sprats (4 packing firms) or pilchards in Belgium during 1955 is estimated at 162.1 metric tons as compared with 71.6 tons in 1954, according to a United States Embassy dispatch (September 26) from Brussels. In 1953 the pack totaled 50.5 tons and in 1952 amounted to 90.6 tons. Only 5 percent of the domestic production, which is produced by four canners of medium importance, is consumed locally. There is no production of canned "true sardines" in Belgium.

Foreign trade statistics (which cover the Belgium-Luxembourg Economic Union (BLEU) indicate that 5,936 tons of canned sardines and pilchards were imported in 1955, with the majority from Portugal (3,411 tons) and Japan (1,214 tons). Imports from the United States consisted of 927 tons of pilchards or California sardines.

Belgium consumption of canned sardines and pilchards appears to be increasing slowly and irregularly. The middle and low income groups are the chief consumers.

Table 1 - Belgium-Luxembourg Economic Union (BLEU) Estimated Consumption of Canned Sardines and Pilebards, 1952-55

		of Car	med Sardines and Pilchards, 1952-	99
			Estimated Consumption	Estimated Total
	Year	Imports	from Domestic Production	Consumption
			(Metric Tons)	
	1955	5,936	8	5,944
	1954	6,005	4	6,009
	1953	4,997	3	5,000
-	1952	4,605	5	4,610

About 50 percent of the consumers buy the $4\frac{3}{4}$ -oz. oblongs, 30 percent the 3-oz. oblongs, 15 percent the 5-oz. flats, and 5 percent the 8-oz. and 16-oz. tall cans.

Table 2 - Source of	Canned Sardine					
and Pilchard Imports by the						
Belgium-Lux	embourg					
Economic Un	ion, 1955					
Country of Origin	Quantity					
	(Metric Tons)					
Portugal	3,411					
Japan 1'/ United States—'	1,214					
United States 1	927					
Yugoslavia	228					
Netherlands	51					
Others	105					
Total	5,936					
1/ All pilchards						

Seventy-five percent of the consumers prefer sardines packed in olive oil; 20 percent, vegetable oil; and 5 percent, tomato sauce. Other packing mediums such as mustard sauce and brine are not consumed in Belgium.

The retail market price of the $4\frac{3}{4}$ -oz. oblong can of sardines, packed in olive oil, ranges from 8.50-8.80 francs (17-18 U.S. cents) a can; in vegetable oil, 8.00-8.30 francs (16-17 cents); and in tomato sauce, 9.30 francs (19 cents). These are current retail prices for the most popular size; prices for other sizes are reported to be proportionate.

According to a well-established local firm which imports large quantities of canned fish from the United States, there is little likelihood that the Belgian market for United States "true sardines" can be developed, because sardines imported from the United States do not suit Belgian tastes. On the other hand, a market does exist for pilchards imported from the United States.

Sardines are generally imported by regular canned fish importers and sold to wholesalers who in turn distribute the goods to retailers.



Brazil

FOREIGN FISHING VESSELS UNDER CONTRACT TO FISH IN BRAZILIAN WATERS: The Brazilian Government has authorized 30 Spanish, Italian, and Japanese fishing vessels to operate in Brazilian waters on a contract basis, according to the October 27, 1956, issue of (Canada) Foreign Trade.

The licensing of these foreign fishing vessels was made to meet the increased demands for fish. The Brazilian Ministries of Navy and Agriculture will organize the fishing industry and grant subcontracts to private firms. One of the requirements is that each crew must include a marine biologist. The plan provides for foreign crews at first, but it is intended that Brazilians will gradually replace the foreign crewmen.

JAPANESE FISHING VESSEL SUPPLIES TUNA TO CITY OF RECIFE: In August-September 1956 the Japanese fishing vessel Kaiko Maru was supplying the Brazilian city of Recife with tuna steaks at the relatively low price of about 20 U. S. cents a pound, thus alleviating one of Recife's chronic food problems. The vessel, with the most modern equipment and a capacity of about 150 tons, belongs to a Japanese fishing company, and was authorized by the Brazilian Government to fish along the northeast coast of Brazil and sell its catch to Recife and other cities.

Despite being a coastal city, Recife is faced with the chronic problem of securing enough fish to supply its population of nearly 750,000. A relatively small supply of fish is provided daily by the fishermen of the raftlike "jangadas"; these catches are sold on the beaches in the evening when the fishermen return from all day at sea; and although this source is grossly inadequate for a city as large as Recife, it is the only constant supply of fish. Consequently, for Recife fish is a relatively high-priced food. During Lent 1956, special action was taken by the Mayor to charter a fishing boat to assure a plentiful supply of fish for the religious holidays. Besides having access to no regularly scheduled fishing boats, Recife's refrigeration facilities are extremely limited, so that fish must be sold quickly before they spoil.

In August 1956 the <u>Kaiko Maru</u> began to make marine studies and soundings of the Northeast Coast to determine the existence of fish in northeastern waters and the possibilities of exporting it from Recife. The <u>Kaiko Maru</u> was successful on its first fishing venture and came to the Port of Recife on August 8 with a full load of fine tuna. Through the intercession of the Governor, a provisory license was secured from the Federal Government for the <u>Kaiko Maru</u> to sell its product in Recife. Frozen boneless tuna steaks were sold to distributors for Cr\$23 per kilo (16 U. S. cents a pound), well under the market price, which were resold to the public at Cr\$30 a kilo (20 U. S. cents a pound). Another 150 tons were likewise quickly disposed of four weeks later.

On September 25, shortly before the <u>Kaiko Maru</u> was scheduled to deliver its third load of tuna to Recife, the National <u>Ministry of Marine</u> in Rio de Janeiro sent a telegram to the Captain of the Port of Recife, advising that the Japanese ship was authorized only to continue its studies of the Northeast Coast, to enter and leave the Port of Recife, but not to engage in commercial transactions.

When news of the telegram reached the press and the general public on September 27, it "..... exploded like a veritable bomb in the midst of the people" (Diario de Pernambuco, September 27). All papers carried the story. Public indignation was aroused to such a pitch that the matter even came to the attention of the State Assembly and the Governor. With so much public pressure generated against the cancellation order, including many telegrams of protest sent to Rio, the order was revoked two days later, according to an October 11 report from the United States Consul in Recife.



Canada

BRITISH COLUMBIA HERRING FISHERY OUTLOOK FOR 1956/57: British Columbia's 1956/57 herring fishery is not expected to produce a total catch on a par with the record 250,000 metric tons taken in coastal waters the previous year. Catch predictions, made at the Fisheries Research Board station at Nanaimo, indicate a decrease in abundance in many areas which, last year, were high producers.

In a forecast, based on the size of catches, availability and spawning escapement in 1955/56 and on expected recruitment in 1956/57, the station states what might be reasonably anticipated in the forthcoming herring fishing season.

Lower east coast subdistrict, recognized as the main producing area of the coast, is expected to yield its normal quota of 40,000 tons although there are indications that abundance here may be slightly lower than in 1955, the September 1956 <u>Trade News</u> of the Canadian Department of Fisheries states.

In the Burnaby Narrows area of the Queen Charlotte Islands, where heavy fishing took place in the winter half of the herring fishing season, a decrease in the level of abundance is expected, and the catch is not likely to be as good as last season.

Some improvement is expected in the northern subdistrict, although it is thought unlikely that the quota will be exceeded. In the central subdistrict a catch of less than the 40,000-ton quota is predicted, unless the 1954 year-class proves to be of greater abundance than estimated.

Regular winter fishing in the upper east coast subdistrict may also be below average unless a large proportion of summer herring from Queen Charlotte Sound are of upper east coast origin.

Some decrease in abundance is anticipated in the middle east coast subdistrict, but the area still is expected to yield double the amount of its normal 10,000-ton quota.

Herring fishing off the lower west coast of Vancouver Island will be much the same as last season. In the Barkley Sound area a catch at least as good as last year is forecast. Little improvement can be expected from the Clayoquot area.

Improved fishing and fair catches may feature herring operations in the Esperanza-Nootka area, provided fish move inshore before the close of the season. In the balance of the area northwards it is predicted that results will remain below average.

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FISH INSPECTION ACT REVISED: Canadian importations of fish and shellfish other than canned need no longer be accompanied by an affidavit, according to the revised Fish Inspection Act regulations. Such importations, however, are still subject to inspection by an inspection officer of the Department of Fisheries, states a November 6, 1956, dispatch from the United States Embassy in Ottawa.

Entry may be permitted of shipments of fish and shellfish other than canned, and any duty applicable is to be collected. However, the fish inspection officer will be responsible for authorizing release and delivery of the shipments, or their detention if necessary.

The Customs Division of Canada's Department of National Revenue, in Memorandum Series D No. 135, dated October 30, 1956, published revisions in the Fish Inspection Act and the places throughout Canada where fish inspection offices are located.

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FISHERY SCIENTISTS PREDICT DISAPPEARANCE OF WEST GREENLAND COD: The disappearance of the cod fisheries from Greenland's west coast was predicted by scientists of the Canadian Fisheries Research Board during a conference of fishery scientists at St. Andrew, New Brunswick. A long range forecast of decreasing water temperatures for the Northwest Atlantic Ocean was made by Dr. Hugh McLellan, an oceanographer, who also said that with the downward

trend in water temperatures in future years a decrease in haddock landings relative to cod landings might be expected.

Dr. W. R. Martin, of the biological station at St. Andrews, said with the disappearance of the cod fisheries from Greenland's west coast there would be an associated increase in fishing intensity on the fishing banks off Nova Scotia and Newfoundland (The Fishing News, October 5, 1956).



Ecuador

SHRIMP INDUSTRY ELIGIBLE FOR LOANS: The National Development Bank of Ecuador announced that loans will be made available to shrimp companies through branches established in coastal provinces. The bank pointed out the growing importance of shrimp exports as a source of dollars, states an October 11 dispatch from the United States Embassy in Quito.

Some observers have commented that official circles seem more favorable to the shrimp industry than they were previously. However, the announcement of the Bank's desire to assist the shrimp industry may mean little in practice as the Bank's funds are limited and demands for loans are greater than the Bank can meet.



El Salvador

FISHING COMPANY'S LICENSE SUSPENDED: One of the few concerns fishing Salvadoran waters under the 1955 Fisheries Development Law had its license suspended by the El Salvador Ministry of Economy, which reasoned that: (1) said law provides that firms granted licenses should give preference to the internal market in selling their catch and (2) it has (allegedly) been established that the firm has limited its activities to catching shrimp for export, while disregarding other species for internal consumption.

This suspension is to remain in effect until the firm establishes or guarantees that it has set up an adequate distribution and sales system to supply internal consumption needs with corroboration as to the quantities distributed daily for this purpose. This is the first such disciplinary measure taken to enforce a provision of the fishing law, states a September 24 dispatch from the United States Embassy in San Salvador.

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REGULATIONS IMPLEMENTING FISHERIES DEVELOPMENT LAW PUBLISHED: Regulations implementing the Fisheries Development Law of October 25, 1955, to govern fishing in the waters of San Salvador for commercial, sport, and domestic consumption, and the issuance of licenses were promulgated by Executive Decree No. 77 issued by the San Salvador Ministries of Economy, Agriculture, Finance, and Defense on September 10, 1956. (United States Embassy dispatch dated October 3, 1956.)



French Cameroons

<u>CANNED SARDINE MARKET</u>: With a population one-third less, sardine consumption in the Cameroons is twice that of French Equatorial Africa. It is probable that 75 percent of the total consumption in the Cameroons is by Africans.

Tab	Table 1 - French Cameroons' Imports of Canned Sardines by Principal Countries of Origin, 1955									
Item	Unit	France	French Morocco	West Germany	Belgium	Denmark	Spanish Guinea	Portugal	Other	Total
Quantity	Metric Tons	8.8	1,012.8	8.7	11.9	40.7	262.4	418.3	2.9	1,766.5
Value: {	Million C. F. A. Francs		109.5	1.1	1.0	3.3	19.5	38.0	0.4	174.9
	US\$1,000	11.7	625.6	6.1	5.5	18.6	111.6	217.4	2.6	999,1
Note: Values	converted to US\$ equival	lent at rate o	f 175 C.F.A. fr	ancs equal US\$1						

Imports of canned sardines totaled 1,766.5 metric tons (valued at US\$999,100) in 1955, with the bulk of the imports supplied by French Morocco.



French Equatorial Africa

CANNED SARDINE MARKET: Imports, the only source of canned sardines in French Equatorial Africa, amounted to 734.0 metric tons (valued at US\$406,118) in 1955 as compared with 872.1 tons (valued at US\$451,336) in 1954.

Table 1 - French Equatorial Africa's Imports of Canned Sardines by Principal Countries of Origin, 1954-55								
Country 1955 1954								
	Quantity	Value		Quantity	Value			
	Metric	Million	US\$	Metric	Million	US\$		
	Tons	C. F. A. Francs	1,000	Tons	C. F. A. Francs	1,000		
France	33.3	4.2	23.8	29.7	4.1	23.5		
Cameroons	-	-	-	8.7	1.0	5.5		
French Morocco.	220.0	22.6	128.9	666.7	56.9	325.0		
Great Britain	-	-	-	1.0	0.1	0.7		
Portugal	444.4	40.5	231.3	146.9	15.1	86.2		
Belgium	-	-	-	1.2	0.1	0.5		
Norway	11.8	1.1	6.2	12.6	1.0	5.6		
West Germany .	21.1	2.4	13.5	7.5	0,6	3.7		
Other	3.4	0.3	2.4	0.8	0.1	0.6		
Total	734.0	71.1	406.1	875.1	79.0	451.3		
Note: Values converted to	US\$ equivale	nt at rate of 175 C.F.A. fi	ancs = US	\$1.				

Consumption of Portuguese sardines increased in 1955 at the expense of French Moroccan sardines. The most popular sizes of canned sardines are the $3\frac{1}{4}$ -to5-oz. flat cans. Sixty percent of the consumers prefer sardines packed in olive oil; and 40 percent, vegetable oil.

In 1955 Europeans in French Equatorial Africa accounted for 60 percent of the sardine consumption. Of European consumption, 40 percent was French sardines, 50 percent Portuguese sardines, and 10 percent French Moroccan sardines. Consumption of sardines by Africans fell in 1955 to about 40 percent of the total consumption. About 75 percent of the sardines bought by Africans came from French Morocco and 25 percent from Portugal.

The retail prices of the $3\frac{1}{4}$ -to5-oz. cans of sardines packed in olive oil range from 26-40 U. S. cents; and in vegetable oil, 11-14 U. S. cents a can.

Imports of any articles from the United States, except urgently needed industrial goods for which there is no French equivalent, are curtailed by stringent exchange controls. This would appear to be true in the case of sardines, in which a foodstuff partially supplied by France is concerned, states a September 5 dispatch from the United States Consulate General at Leopoldville.



French West Africa

TUNA CATCH QUOTA FOR SECOND SEASON: The Tuna Committee which met recently (World Fishing, October 1956) to make a catch quota for the recently-developd (started December 1955) tuna fishery off the coast of French West Africa ran into difficulties.

Because of the limited freezing and processing equipment in the French African possessions, the catch was to be fixed at 5,000 metric tons, but it was announced that two freezing ships were coming into operation and that their catch was sold in advance. It was therefore decided to increase the catch in African waters from 5,000 to 6,000 tons. It was also decided that the catch of the St. Jean de Luz fleet should remain at 3,000 tons, that of the Breton fleet should be increased from 2,000 to 3,000 tons, and that local committees should decide how this figure should be divided between landing ports. Prices were fixed at about 13.0 U.S. cents a pound for whole fish, about 14.9 U.S. cents for drawn and bled fish, and about 16.3 U.S. cents when dressed. The Breton fleet's catch is to be delivered to Dakar at these prices.

Note: See Commercial Fisheries Review, February 1956, p. 44.



Iceland

ICED-FISH TRADE DISCOURAGED IN FAVOR OF DELIVERIES TO FREEZING PLANTS: One significant recent trend in Iceland's official fisheries policy is lack of interest on the part of the Government in resuming the iced-fresh fish trade with Western Europe. Both the Government and the freezing plants feel that resumption of this fresh fish trade will disrupt commitments for large quantities of frozen fillets and other fishery products for the Soviet Bloc. The trawler owners' association on the other hand claims that the pending settlement of the United Kingdom ban on direct landings of fresh fish will be to their advantage pricewise.

The difference of opinion between the trawlermen and the Government was settled by an agreement which raised the ex-vessel price of cod from Ikr. 0.85 to Ikr. 1.00 a kilo (from 2.4 to 2.8 U. S. cents a pound), ocean perch from Ikr. 0.75 to 0.90 a kilo (from 2.1 to 2.5 U. S. cents a pound), and the prices for other varieties were increased correspondingly. There also was to be a corresponding increase in the price of salt fish. This agreement was subject to the stipulation that Icelandic trawlers would land at least two-thirds of their catches for domestic processing. The Union of Icelandic Steam Trawler Owners agreed to this condition.

NEW TRAWLERS MAY BE FINANCED BY FOREIGN LOANS: A bill has been submitted to the Government (Althing) calling for the construction of 15 new trawlers and 6 smaller vessels financed by foreign loans. The bill calls for US\$9,225,000 for construction of the trawlers and US\$922,500 for the smaller vessels. Loans would be made to the builders of the trawlers for 85-90 percent of the cost and up to 80 percent on the cost of the smaller boats. The Government has ordered that the new

vessels if and when built be distributed with a view to achieving a greater balance of the population throughout the country.



Japan

FISHERY RESEARCH SHIP DEPARTS FOR BRAZIL: The fishery research ship Toko Maru (1,100 tons) left Japan for Brazilian coastal waters on October 20 to assist the Brazilian Government in the development of its marine resources.

The expedition will be led by five Japanese fisheries experts headed by Dr. Koji Nakamura, head of the Fisheries Agency's South Seas Marine Institute. A staff of scientists includes faculty members of Mie and Kochi Universities. They will employ a great deal of new equipment for fishing and processing, and the collecting of oceanographic and biological data.

This is the latest in the series of cooperative endeavors undertaken between the two countries in varied fields such as culture, commerce, emigration, and fishing.

While Food and Agriculture Organization statistics show that Brazil's catch is the largest in Latin America, experts feel that favorable natural conditions make much larger catches possible. They point out that the coastal waters include the mouth of the Amazon where the intermingling of fresh and salt water provides rich nutritive compounds; the Brazilian warm current which abounds in migrating schools of fish; and the extensive South Brazilian sea shelf where the Brazilian warm current and the Falkland cold current meet.

Scientific development of these fishing grounds can bring the people of Brazil a larger supply of protein and contribute greatly to the Brazilian economy.

The charting and collection of scientific data in the area will run from mid-December 1956 until late April 1957.

The research will cover classification, species composition, and size range of fish and plankton, and the temperature, color, transparency, salinity, and chemical components of the waters.

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NORTH PACIFIC FACTORYSHIP KING CRAB MEAT PACK THROUGH AUGUST 1956: The pack of king crab meat by the Japanese factoryships operating in the Sea of Okhotsk and the Bering Sea during August totaled 108,000 cases (48 $\frac{1}{2}$ -lb. cans) to bring the total for the season to 377,000 cases. By the end of August the factoryship operating in the eastern area of the Bering Sea and two of the four fleets fishing in the Sea of Okhotsk had finished for the season.

The pack by area through August 31 was as follows: Eastern area of the Bering Sea, 57,000 cases; western area of Bering Sea, 40,000 cases; Okhotsk Sea, 280,000 cases. The total pack by three factoryship fleets in 1955 was 208,850 cases (Monthly Statistics of Japanese Fisheries, September 1956).

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RESEARCH SHIP TO SURVEY WESTERN ATLANTIC FISHERIES: The Kanagawa Prefecture's high-seas fisheries guidance ship Sagami Maru (770 tons) left

Yokohama on September 12, 1956, to survey the fishing grounds in the Western Atlantic and in other areas.

Because of the fact that at present one-half of the price of Indian Ocean tuna represents transportation costs, these new fishing ground surveys will be paralleled by market surveys in various parts of western Europe, looking to direct export from the fishing ground to consuming markets as the most advantageous method of operation.

The vessel will sail through the Indian Ocean, the Red Sea, and the Mediterranean, thence to the Atlantic off Cuba and Brazil in South America. Tuna fishing will be done in all of these areas, fish will be landed at various places on the coasts, and the market situation will be studied. The vessel will return by the same route.

The cruise is expected to take 358 days, and the catch goal is 1,280 tons of yellowfin, big-eyed, and albacore tuna (Nippon Suisan Shimbun, September 10, 1956, a Japanese trade publication). This survey is a part of a planned program to alleviate the pressure on Japanese coastal fisheries and to improve the economic position of Japanese fisheries.

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RESEARCH SHIP PARTICIPATES IN TUNA-TAGGING PROGRAM: The Mie Prefecture fisheries guidance ship Jini Maru (196 tons) tagged 270 albacore tuna during two cruises in June 1956 to the albacore grounds about 200 miles off Cape Nojima in Chiba Prefecture. The cruises were made as part of a joint Japanese-United States tagging experiment to study the migrations and growth of albacore tuna. Data on which to base future efforts for this type of study were also acquired (Nippon Suisan Shimbun, September 7, 1956).

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TUNA VESSEL TO FISH IN ATLANTIC OCEAN: The Japanese fishing vessel Koun Maru (479 tons) sailed on September 10, 1956, from Misaki, Japan, with a crew of 33 to fish for tuna in the Atlantic Ocean. The vessel will make Genoa, Italy, its port of landing.

This venture has attracted considerable interest in Japanese fishing industry circles.

The reasons behind the plan for this ship to go to the Atlantic are: (1) most of the operations of tuna fishing boats at present are planned to catch fish for the United States market, but because the fishing grounds of the Indian Ocean and the South Pacific require long voyages averaging about 3 months, the fish are brought back in poor condition and prices are low, and (2) as much as 6 months to a year passes from the time the fish is caught until it is exported.

Under the Koun Maru's operating plan, with a base at Genoa, Italy, the time from capture of the tuna to its landing will average about one month. The ship will fish in the Indian Ocean en route and the plan is to deliver about 300 tons of tuna at Genoa and then fish in the Atlantic. Around mid-May 1957, the vessel will return to Japan with a cargo of Italian rice representing the value of the tuna landed in Italy.



Mexico

WEST COAST SHRIMP FISHERY FOR 1955/56 PROFITABLE: The shrimp season on the west coast of Mexico, which began on September 1, 1955, and terminated on August 31, 1956, is reported to have been the best that the industry has experienced for a great many years. Exports were high and the boats fishing in coastal waters averaged approximately 50 tons each. Bay production was also very high. At the request of the industry itself the Mexican Government changed the closed season from the summer months to a 60-day period from March 15 to May 15. This conservation measure proved successful, and production in the months following was very good in both quantity and quality.

The market for Mexican west coast shrimp in the United States was excellent all season, due in part to lighter catches by United States vessels operating in the Gulf of Mexico, points out an October 5, 1956, report from the United States Consul in Nogales.

As a result of the excellent season, shrimp-boat and plant owners were able to liquidate financial obligations that had accumulated during the past bad seasons. Plans for expanding and modernizing both plants and fleets are now under way. The shipyards at Mazatlan and Guaymas have under construction or under contract to construct some 40 additional vessels, which will bring the entire shrimp fleet up to about 450 vessels. All equipment for the vessels and shore plants are reportedly being made in the United States.

The trend in the shrimp packing plants is to mechanize the processing of shrimp, partly to solve the problem of labor shortage during peak production and also to improve the packing and packaging of their products to meet consumer demands in the United States.

The policy of the Mexican Government towards the shrimp industry during the past season has been, in general, liberal and cooperative. In August there was an increase in the rate of the export duty amounting to about 40 pesos (US\$3.20) a ton. The increase was expected, but it turned out to be much smaller than anticipated.

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SHRIMP FISHERY TRENDS, OCTOBER 1956: The October 1956 catch of shrimp on the west coast of Mexico was reported to be off from the high level of 1955. The catches were good, but below those of October 1955 when an unusually good run of brown shrimp appeared. The brown shrimp have not shown up in the catches to date, states a November 6 dispatch from the United States Embassy in Mexico City.

The shrimp catch on the east coast of Mexico this October was reported to be about the same as for October 1955 due to the increased number of shrimp vessels operating, but the catch per boat was down.

The Mexican shrimp fleet is increasing and it is estimated that 50 vessels are now under construction. The shrimp market remained firm and higher prices prevailed this October than in the same month of 1955.

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MERIDA SHRIMP FISHERY TRENDS, JULY-SEPTEMBER 1956: Exports of shrimp from the Mexican province of Merida during the third quarter of 1956 totaled close to 4.7 million pounds, all shipped to the United States.

Average wholesale prices at Brownsville for the Merida 15-20 count headless brown shrimp were reported as 85 cents in July, 80 cents in August, and 75 cents

in September. The decline in prices was seasonal and market conditions were considered to be good, both for the present and the future.

The buying on credit of boats and gear continues in the Merida shrimp industry. With prospects of increased export taxes and assessments for civic improvements, a serious decline in the market for shrimp could be harmful to the industry, points out an October 19, 1956, dispatch from the United States consul in Merida.

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SOME FISHERY PRODUCTS ADDED TO IMPORT DUTY LIST: Various preserved fishery products were added to the list of items subject to import duty in the Mexican free zone of Baja California and the partial free zone of the State of Sonora, effective September 8, 1956 (see table).

Table 1 - Preserved Fishery Products Subject to Import Duty in the Mexican Free Zone of Baja California and the Partial Free Zone of the State of Sonora

Product	Mexican Tariff		ıty				
Troduct	Classification	Specific +	Ad Valorem				
		Pesos					
		Per Kilo	Percent				
Tuna, preserved	043.00.02	2	50				
Mackerel, preserved	043.00.06	2	50				
Sardines, preserved, weighing with							
immediate container up to 5 kilos							
(about 11 lbs.), providing container							
is labeled to indicate contents	043,00,09	2	50				
Crustaceans and molluscs, pre-							
served, not specified	043.00.98	2	45				
Note: 2 Mexican pesos equivalent to about US\$0.16.							

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TUNA CANNING PLANT AT CAPE SAN LUCAS HAS GOOD SEASON: The tuna canning plant located near the southern tip of Baja California at Cape San Lucas completed a successful season in August 1956. The plant reportedly paid out about US\$400,000 to fishermen and laborers during the packing season. Most of the fish purchased by the cannery was caught by United States fishing vessels operating in the Cape San Lucas area.

The management of the tuna canning plant plans on enlarging the capacity of the plant to handle 25 tons of tuna daily. The expanded packing facilities will provide employment for about 300 local workers, states an October 1 dispatch from the United States Consulate in Tijuana.



Norway

FACTORYSHIP FISHES FOR SAND LAUNCE: The Norwegian factory trawler Havkvern had excellent luck in fishing for sand eels or launce (Ammodytes) which it found in tremendous quantities in the Silver Pit southwest of Dogger Bank in the North Sea, according to reports in Fiskaren (October 3 & 10, 1956), a Norwegian fisheries periodical. Although the Danes have taken sand eels in this area in volume for some years, the Havkvern's trips to the area represent the first Norwegian participation in the fishery. The ship is equipped with a reduction plant and normally fishes for herring.



The sand eel season runs from April through July. During this period the Havkvern caught 1,860 metric tons. The sand eels were taken in 10 to 20 fathoms of water and were present in such quantities that trawlers of medium size had average catches of 23-28 tons daily. The usual herring trawls are excellent gear for taking the fish which are from 15 to 30 centimeters

(6-12 inches) long. Sand eels are used only for the production of fish meal and oil.

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TERRAMYCIN TESTED ON WHALE MEAT: Two Norwegian whaling companies, in cooperation with a New York Pharmaceutical firm, have for some time been testing the effectiveness of terramycin in slowing the decay of whale meat. According to the Norwegian Journal of Commerce and Shipping, the initial experiments seem promising. Whale meat treated with the antibiotic drug has shown no sign of decay as late as 48 hours after the whale was caught in the Norwegian Sea and brought to the shore station in Norway.

The usual test procedure is to use drug-injecting harpoons. Loading the harpoon tip with terramycin is intended to facilitate the distribution of the bacteriakilling drug throughout the tissues. However, extensive testing will be required to determine just how long this method will delay intestinal decay, which otherwise sets in immediately. Further experiments will therefore be made in the Antarctic (News of Norway, October 25, 1956).



Panama

NEW VESSELS BEING BUILT: Two small live-bait boats are being built by the largest fisheries cooperative in Panama for use in fishing for corvina (Cynoscion stomanni) and red snapper (3 species--Lutjanus guttatus, L. Cysnopterus, and Hoplopagrus guntheri), according to a letter received from the President of the Cooperative. These same boats will experiment with commercial trap fishing for spiny lobsters which are reported abundant off both coasts of Panama.

FILLET EXPORTS: The Cooperative has been exporting to the United States frozen skinless fillets packed in one-pound packages. Corvina fillets are being exported at the rate of 8,000 pounds a month; flounder fillets at the rate of 6,000 pounds a month. Also, some exports of catfish fillets have been made

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SHRIMP COOPERATIVE BUILDS STEEL TRAWLER: The first steel shrimp trawler (a 45-ton boat built by a foundry in Colon) to be built in Panama was launched on August 23, 1956. The large Panama shrimp cooperative plans to replace all its wooden vessels with steel craft eventually, due to the high maintenance costs on wooden boats. All the new fishing vessels must be constructed in Panama in order to engage in the shrimp fishery in Panamanian waters, states a September 28 dispatch from the United States Embassy in Panama.



Republic of the Philippines

CANNED HERRING AND MACKEREL REMOVED FROM IMPORT CONTROL: The Monetary Board of the Philippines announced on November 13 that both canned herring and mackerel were removed from the list of products subject to import controls (United States Embassy dispatch, dated November 15, 1956). Under control, imports of canned mackerel and herring were limited by the Philippine Government.



Portugal

CANNED FISH EXPORTS, JANUARY -JULY 1956: Exports of canned fish by Portuguese canners continued to show a substantial decline for the period January-July 1956, as compared with the similar period in 1955. The drop in exports of canned fish thus far in 1956 reflects the poor catch of sardines, states a September 6 dispatch from the United States Embassy in Lisbon.

Portuguese canned fish exports in July 1956 totaled 2,332 tons (122,700 cases), valued at US\$1.4 million, as compared with 4,852 tons, valued at US\$2.4 million,

for the same month in 1955.

For the first seven months of 1956, canned fish exports amounted to 20,367 tons (1,071,900), valued at US\$11.6 million, as compared with 32,118 tons, valued at US\$16.4 million, for the same period in 1955.

Portuguese Canned Fish Exports, January-July 1956							
Species	January-July 1956						
	Metric	1,000					
	Tons	US\$					
Sardines in olive oil	15,522	8,176					
Sardinelike fish in olive oil	2,357	2,054					
Sardines & sardinelike fish							
in brine	566	109					
Tuna & tunalike in olive oil	671	551					
Tuna & tunalike in brine	169	96					
Mackerel in olive oil	821	512					
Other fish	261	135					
Total	20,367	11,633					

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Portuguese Canned Fish Pack, Jan,-May 1956					
Product	Net Weight	Canner's Value			
In Olive Oil: Sardines Sardinelike fish Tuna Other species (incl., shellfish). In Brine: Sardinelike fish Other species	Metric Tons 625 1,302 290 45 660 37	1,000 <u>US\$</u> 401 1,267 247 31 201 8			
Total	2,999	2,155			

CANNED FISH PACK, JANUARY-MAY 1956: The Portuguese canned fish pack of 1,257 tons in May 1956 improved over the very light pack (311 tons) of the previous month. The pack during May was about 65 percent sardinelike fish.

The canned fish pack for January-May 1956 amounted to 2,999 tons (157,800 cases), the September 1956 <u>Conservas</u> <u>de</u> Peixe points out.

The total pack of canned fish for January-May 1955 amounted to 6,567 tons, with sardines in oil accounting for 60-percent of the pack as compared with 22 percent in January-May 1956.

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<u>FISHERIES TRENDS</u>, <u>JULY 1956</u>: <u>Sardine Fishing</u>: The Portuguese sardine catch during July 1956 increased to 5,651 metric tons (ex-vessel value US\$906,000), higher by 4,129 tons than the 1,522 tons reported for June 1956. The July sardine catch was fair but still well below the 9.811 tons reported for July 1955.

Sardines purchased by the packing centers during the month amounted to 2,857 tons (valued at US\$597,000), or about 51 percent of the catch. During July 1955 the canners purchased 5,377 tons (valued at US\$772,000), about 55 percent of the catch. Ex-vessel prices were higher in July 1956, about US\$160 a ton as compared with about US\$130 a ton in July 1955. The balance of the sardine catch was utilized primarily for immediate consumption on the fresh fish market.

The principal port of landing for sardines in July was Matosinhos with 33 percent of the catch, followed by Portimao (2 percent), and Lisbon with about 15 percent.

Other Fishing: In July 1956, landings of fish other than sardines totaled 5,865 metric tons (valued at US\$604,000 ex-vessel) and consisted of anchovy (966 tons) and chinchard (4,869 tons).

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LANDINGS OF FISHERY PRODUCTS IN PORTUGAL, MADEIRA, AND AZORES, 1955: The catch of fish and shellfish by the Portuguese fishing fleets operating out of Portugal, Madeira, and the Azores totaled 481.4 million pounds (218,433 metric tons) in 1955. A substantial catch of cod from the Western Atlantic and the catch of the shore-based whaling fleet are not included. The catch of mainland Portugal was dominated by sardines (47.1 percent) and chinchards (17.8 percent). The catch for the Madeira Islands consisted of 55 percent tuna and related species and 29.6 percent scabbardfish; that for the Azores was 41.3 percent tuna and tunalike species and 37.6 chinchards.

The catch of shellfish in Madeira and the Azores was neglible, but the mainland Portuguese catch of shellfish included 1,491 metric tons of cuttlefish, 914 tons of octopus (pulpo), and 2,026 tons of crustaceans, which included some spiny lobsters, some of which are exported to the United States.

Table 1 - Landings of Fishery Products, Portugal, Madeira, Azores, 1955									
Species	Portugal		Madeira		Azores		Total		
	Metric	US\$	Metric	US\$	Metric	US\$	Metric	US\$	
	Tons	1,000	Tons	1,000		1,000	Tons	1,000	
Tuna and tunalike	1,977	524.0	3,098	400.6	3,027	228.2	8,102	1,152.8	
Anchovy and sprat	4,873	798.8	-	-	-	-	4,873	798.8	
Spanish and common mackerel	4,484	563.9	247	22.3	311	24.6	5,042	610.8	
Chinchards	34,916	2,770.5	306	31.2	2,759	181.8	37,981	2,983.5	
Corvina	905	213.1	-	-	-	-	905	213.1	
Sardines	92,330	11,326.0	-	-	91	12.6	92,421	11,338.6	
Cachocho and besugo	5,176	618.1	-	-	3	0.6	5,179	618.7	
Pargo and sea bream	9,612	1,697.1	28	5.7	20	2.6	9,660	1,705.4	
Scabbard fish	2,276	396.3	1,667	150.1	-	-	3,943	546.4	
Whiting	13,622	3,728.9	-	-	-	-	13,622	3,728.9	
Other	25,976	4,435.6	295	44.0	1,120	145.0	27,391	4,624.6	
Total Salt-Water Fish	196,147		5,641	653,9	7,331	595.4	209,119	28,321.6	
Crustaceans	2,026	420,0	-	-	15	11.4	2,041	431.4	
Squid	460	111.4	-	-	2/	0.1	460	111.5	
Cuttlefish	1,491	207.8	-	-	-	-	1,491	207.8	
Octopus	914	181.7	-	-	4	1.1	918	182.8	
Mollusks	3,772	65.3	6	0.7	-	-	3,778	66.0	
Shellfish Total	8,663	986.2	6	0.7	19	12.6	8,688	999.5	
Total Fresh-Water Fish	626	187.2	-	-	-	-	626	187.2	
Grand Total	205,436	28,245.7	5,647	654.6	7,350	608.0	218,433	29,508.3	
1/Excludes whale and cod catches. 2/Less than one ton.									

Note: Values converted to US\$ equivalent at rate of 28.75 escudos equal US\$1.

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NEW FISH CANNING REGULATIONS: New fish canning regulations, promulgated in a decree-law 40,787, dated September 27, 1956, were designed to improve distribution of sardine supplies among canners and to assure stable prices for fish sold to canners. The decree provides that sardines will be supplied under regulations to be arrived at through joint agreement between the sardine fishermen's guild and the fish-canning guilds. The measure also seeks to fix annual quotas for canners as well as maximum and minimum prices which canners pay for sardines. Canners in localities where the supply of fish is inadequate would be guaranteed supplies from other canning centers under the new regulations.

Government technical and financial support of sales promotion campaigns also is an objective of the new measure. The Portuguese Canned Fish Institute is required to take "necessary measures to increase productivity in the industry to enable it to compete under more favorable conditions in foreign markets."

The Government under the new decree-law is to proceed immediately with reorganization of the fish-canning industry. Powers are to include determination of the minimum size of canning establishments, study of production costs, supervision of sales prices, adjustment of wages, and relocation of surplus labor.

It is thought that the new measure seeks in part to establish means of mitigating seasonal unemployment. At times, conditions calling for relief in some form have occurred with changes in runs of fish off the Portuguese coast and the size of the catch. There had been reports of distress among cannery workers in southern Portugal early in 1956, states an October 11, 1956, dispatch from the United States Embassy in Lisbon.

Sales promotion plans under the new measure refer to means of expanding canned fish supplies for export, and the proposal is made that sales promotion campaigns should aim at marketing sardine surpluses in new markets, specifically in eastern Europe and in the Near East, as well as in the United States. Reference is

made in the preamble of the measure to the fact that "there are no administrative barriers in American markets."



Singapore

PORT FACILITIES FOR JAPANESE FISHING VESSELS RESTRICTED: The Singapore Ministry of Commerce and Industry in October 1956 issued the following announcement:

"Japanese fishing vessels wishing to make use of the port facilities of Singapore for bunkering, provisions, or repairs will be permitted to do so provided that if cargoes of fish are carried by such vessels none of the fish is landed locally or transshipped.

"Japanese fishing vessels registered by the Japanese Government as tuna fishing vessels may transship their catches in Singapore for onward carriage to other countries under and in accordance with the conditions of special licenses issued by the Controller and Registrar of Imports and Exports. Permission will not be granted for the disposal locally of the catches brought into Singapore by these vessels, but transshipment facilities only will be permitted.

"All Japanese fishing vessels entering the Port are required to report to the Master Attendant immediately on arrival at the Port and will have to comply with his directions. Port clearances will be issued by him to all such vessels when they have complied with the provisions of the Merchant Shipping Ordinance."

The Chief Fisheries Officer of Singapore revealed that the move was in response to an approach by certain Japanese fishing companies which desired better transshipment facilities for sending tuna on to Japan, Europe, and the United States. These fishing companies send fishing vessels to the Indian Ocean to obtain tuna, but wish to avoid having them return all the way to Japan to deliver their catch to the canneries. With the use of Singapore's facilities, the vessels can discharge tuna there for fast onward shipment to canneries not only in Japan, but to the rest of the world as well. Singapore officials, however, were fearful that unless stringent regulations were laid down governing the activities of the Japanese vessels, "marketable" fish other than tuna would be "dumped" on the Singapore market. The earnings of local fishermen would suffer as a result. There was nothing to fear from tuna, since it would have to be canned in order to satisfy local tastes; furthermore, very few retailers would accept fish weighing as much as tuna.

In addition, Malayan fishermen would find it very difficult to compete with the Japanese here. It is for that reason the Fisheries Officer stated, that protective measures of this sort are necessary. Japanese fishing vessels may still bring "marketable" fish to the local market under any one of three conditions: these are, (1) the vessels are chartered by a Singapore or Malayan firm; (2) the vessels are owned by one of the "joint venture" firms recently established here or in North Borneo; or (3) the Japanese permit the intensive training of local fishermen on board. Regarding the third alternative, at the present time over 40 trainees are serving on such Japanese vessels, states an October 18, 1956, dispatch from the United States Consul in Singapore.



Spain

FISHERIES TRENDS, SEPTEMBER 1956: Fishing: The fish catches landed at Vigo, Spain, during September 1956 and sold on the Vigo fish exchange amounted to about 15.2 million pounds, valued at about US\$994,544. The September 1956 landings increased in volume about 30 percent as compared with August 1956 and an increase of about 5.3 percent over September 1955. First sales of fresh fish in September 1956 were made at an average price of about 6 U. S. cents a pound as compared with 9 cents a pound in August 1956 and 5 cents a pound in September 1955.

The albacore tuna (Germo alalunga) moved toward the north of Spain during the early part of September. Catches of albacore entered through the Vigo fish exchange amounted to 210,000 pounds in September as compared with 1.8 million pounds for the previous month. The albacore season was practically finished by the end of September and prices were as high as 20 U.S. cents a pound. On the whole, the albacore season was a successful one for the Spanish fishermen and definitely better than for 1955.

The needle fish (Ramphistoma belone) catches ran high in September and were purchased by the canneries as a substitute for sardines.

<u>Fish Canning</u>: During September 1956, the fish canneries in the Vigo area purchased 8.2 million pounds of fresh fish, as compared with 3.7 million pounds in August 1956 and 5.2 million pounds in September 1955.

All canneries in the Vigo consular district (there are approximately 100 in the Province of Pontevedra) operated at a fairly high level during September with albacore tuna and needlefish catches. The canning of needlefish stepped up as deliveries of albacore decreased. Some Pontevedra canneries even brought albacore by truck from ports in the north of Spain in order to be able to complete their orders.

The olive oil and tinplate situation are the pernnial complaints of the canneries. For the present there is an adequate supply of olive oil. Canneries which were able to estimate their requirements at the beginning of the albacore season purchased stocks of olive oil cheaper than the current price. It is reported that the Bilbao plant is presently unable to supply tinplate to the canneries and that imports from Great Britain during September amounted to 400 short tons.

Foreign Trade: Swiss firms have been the largest foreign buyers of albacore, but it is the general opinion that part of the shipments to Switzerland (usually via Rotterdam) reach other countries in Europe. There appears to be no demand for the Spanish albacore in the United States, due to high prices and need for a different method of packing. There have been a few small shipments of frozen octopus (Octopus vulgaris) to the United States with fair prospects for increasing this trade.

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TUNA CATCH GOOD FOR 1956 SEASON: The coastal fishermen of Spain have had the most successful tuna catch in recent years. The market prices have averaged about 60 percent higher this year over 1955, or from about 19-21 U.S. cents a pound as compared with about 12-13.5 U.S. cents a pound in 1955. The higher prices are believed to be due to the better prices offered by French buyers and this has forced Spanish buyers to offer substantially higher prices in order to obtain supplies for canning. It is estimated that about 50 percent of the catch has been sold to the French.

The tunafish canners have also been plagued by a shortage of cannery help and the payment of higher wages has failed to solve this problem. It has been particularly difficult to attract help at overtime wages when overtime is needed to handle

a heavy volume of fish. Some women workers who formerly worked for about 6-7 cents an hour now receive about twice this sum, states an October 17, 1956, dispatch from the United States Consulate in Bilbao.

Note: Values converted to US\$ equivalent at rate of 1 peseta equals US\$0,033.



Tunisia

SHRIMP PRODUCTION, 1955: The catch of shrimp in Tunisia is grouped with other shellfish under "crustaceans" (shrimp, prawn, and lobsters). The catch in 1955 for this category of landings was only 176,300 pounds. Exports amounted to about 94,100 pounds, all of which went to France, except for 372 pounds to Algeria (a United States Embassy dispatch dated October 8, 1956).



Turkey

EXPORTS OF FISHERY PRODUCTS ENCOURAGED: In an effort to encourage exports of fishery products, Turkey will permit 10 percent of the foreign exchange obtained from the f.o.b. value of such exports to be allocated for imports of equipment for fishing, transportation, processing, etc., for the use of fishermen, processors, and exporters. The Meat and Fish Office of Turkey will handle the special account at the Central Bank and allocate the equipment to be imported.

It is reported that during 1955 the Turkish catch amounted to 111,523 metric tons of fresh and salt-water fish, of which 15,050 tons (f.o.b. value US\$3.6 million) were exported (14,000 tons fresh or frozen). Greece, Italy, and Rumania were the principal buyers, reports Canada's Foreign Trade of November 10, 1956.



Union of South Africa

ANTARCTIC WHALING FLEET MAY BE SOLD TO JAPAN: Subject to confirmation by the shareholders and both the Union of South Africa and Japanese Governments, the Union Whaling company of Durban will sell its Antarctic whaling fleet to Japanese interests. This company is the only South African company operating an Antarctic whaling fleet, but it plans to continue its shore-based offshore whaling activities in Durban, South Africa, using the nine smaller catchers left in its fleet.

The Antarctic fleet to be sold consists of the factoryship Abraham Larsen (23,000 tons) and eight catcher boats. The selling price is reported to be US\$7,602,000 for the factoryship and US\$156,800 each for the catcher boats. The factoryship price is said to include US\$1,120,000 in return for an agreement on the part of the Union Whaling company to refrain from Antarctic whaling for five years. The plans call for delivery of the whaling fleet at the end of the 1956/57 season, according to United States dispatches from Pretoria dated November 2, 1956, and Durban, dated October 23, 1956.

The sale is being made because of decreasing financial returns due to the reduced number of whales that can be taken in the Antarctic under international agreement and steadily increasing operating costs. The Japanese whaling fleets

are in a relatively favorable profit-making position as they have a ready demand for whale meat in constrast to the Union's dependence on the sale of whale and sperm oil only.



U. S. S. R.

NEW DIESEL TRAWLERS TO HAVE CANNING PLANTS: Canning plants as seen on board the Russian vessel Muksun, which put into Grimsby recently, are to be fitted to the 20 Diesel trawlers being built in England for Russia. Each plant costs £1,100 (US\$3,080) and is essentially an innovation for long-distance trawlers.

The first plant was fitted into the trawler <u>Pioneer</u> in January 1956 and consists of a semi-automatic vacuum double-seaming machine, and a horizontal steam sterilizing retort.

The equipment is built entirely to Russian specifications and caters for all the operations involved in filleting, freezing, and canning livers, and handles about 1,500 8-ounce cans a day.

Some 15,000 cans are carried. The cans are fitted in trays in a special stowage rack, which separates the can store from the packing room and insures smooth operations under difficult sea conditions. (The Fishing News, September 7.)

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SCIENTISTS USE LIGHT TO CATCH FISH: Experiments have shown that while fishing on dark nights over 50 different kinds of fish can be attracted and caught more easily with the help of electric light (The Fishing News, September 21, 1956). The fish were not attracted to the electric light during moonlit nights.

This has been proved by a Russian scientist who conducted tests in which a powerful electric lamp was lowered into the water alongside a conical net. The net was hauled in full of fish within 2 or 3 minutes.

One small vessel using this method made a particularly large catch of mackerel, obtaining some 17 tons of fish in one night.

To assist the scientist to study the movements of the fish round the light, underwater television equipment was used, comprising a small waterproof shell containing a highly sensitive transmission tube connected by cable to a television receiver on the ship.

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STERN-TRAWLING FACTORYSHIPS AND DIESEL TRAWLERS COMPLETED: The first of 24 stern-trawling factoryships and the first of 20 Diesel trawlers being built for U. S. S. R. have been completed.

The factoryships are being built in West German shipyards apparently of the same general design as the British factoryship <u>Fairtry</u>. Approximately 245 feet between perpendiculars and 2,555 gross tons, they are designed to freeze whole fish; to process, freeze, and pack fillets; and produce meal and liver oil. They will carry a crew of 100.

The Diesel trawlers are being built at Lowestoft, England. They are approximately 172 feet between perpendiculars and have meal and liver plants. (Fisheries Newsletter, a publication of Australia; Commonwealth Director of Fisheries.



United Kingdom

<u>CONTINUES IMPORTS</u> <u>OF JAPANESE CANNED SALMON</u>: The British Board of Trade has annouced that arrangements for further imports of Japanese canned salmon have been made. Imports of canned salmon will be made to a value of US\$4.2 million and import licenses will be valid up to September 30, 1957, states a September 26 dispatch from the United States Embassy in London.

* * * * *

NEW FROZEN FISH PROCESSING PLANT FOR HULL: A new fish and other foods processing plant, estimated to cost over US\$280,000, is nearing completion at Hull, England. The new plant, which is situated close to the Hull fish piers, will have a frontage of about 240 feet, states The Fishing News (September 14, 1956), a British fisheries periodical.

The new Hull plant, which will be one of the finest of its kind in Europe, will replace a smaller one. Present employment of between 50-60 employees will be doubled as developments warrant it.

The ever-increasing popularity of frozen products in their attractive wrappings has encouraged the present ambitious venture, which among other things should be a dollar earner.

The production of a wide range of frozen foodstuffs, mostly fish, is contemplated. Among the line which will be prepared there are fish sticks, frozen cod, and plaice.

A spacious unloading platform for the receipt of fish has been built at the entrance to the new factory. Much of the ground floor space is taken up by a tiled filleting room with two processing lines and other equipment, which includes a conveyor-belt system. Three freezing units, each of which is capable of dealing with a ton of fish in 2 hours, are being installed. There is also cold-storage space for about 300 metric tons.

* * * * *

NINTH TRAWLER FOR RUSSIA LAUNCHED: The ninth vessel of the 20 Diesel trawlers ordered by Russia from a British shipyard was completed and launched on October 9, 1956, states the October 12 issue of The Fishing News, a British trade periodical.

These vessels, almost 190 feet in over-all length with a loaded displacement of approximately 1,300 tons, are especially constructed to meet Arctic conditions. Exceptional consideration has been given to their stability in ice conditions and general seaworthiness.

They have an exceptionally high standard of equipment and finish. The fifth Russian trawler Ogonj (Flame) is rapidly completing her fitting out and will shortly undergo sea trials.





Federal Trade Commission

SALMON PRICE FIXING IN PUGET SOUND AREA ORDERED STOPPED:

The Federal Trade Commission on October 22, 1956, ordered (Order and Docket No. 6376, Salmon) that fixing of salmon prices in the Puget Sound area be stopped. The order is directed to the area fishermen's union and vessel owners' association. The October 26 Federal Register published the cease and desist order.

The Commission, in an order accompanied by an opinion by Commissioner Robert T. Secrest, adopted as its own the initial decision of Hearing Examiner William L. Pack, which prohibits price-restricting agreements between these two groups.

Commissioner Lowell B, Mason dissented to the order "to the extent that it attempts to impose sanctions upon association members and union members who were not parties respondent,"

The examiner had found that the two groups have made restrictive agreements which, along with minimum price-fixing contracts negotiated between the union and the area salmon canners, "substantially" restrain competition in the industry with a tendency to enhance the price of canned salmon.

Thirteen area canners, who had been named in the Commission's complaint charging the conspiracy, accepted a consent order in March 1956 prohibiting price-fixing activity.

The Puget Sound salmon area extends from the Canadian Border and Cape Flattery 150 miles south to Seattle and Tacoma. Salmon is one of the most important industries in that part of the United States, where in 1954 the wholesale value of the salmon pack was \$12 million. "Purse Seine" vessels, so named because the seines used resemble purses, account for approximately 75 percent of the salmon catch in the area.

The Union had argued that the boat owners actually are agents of the canners and that, therefore, the fishermen are employees of these canners. Any agreement between the Union and the canners, this respondent asserted, is an agreement for wages.

In making this defense, the Union had asked the examiner to require 10 of the canners to produce certain records, showing the negotiations between the canners and the boat owners, particularly with respect to post-season bonuses paid to skippers, for a period of six years, The examiner's refusal to do this was appealed to the Commission.

Denying the appeal, Commissioner Secrest stated:

"The record clearly shows that the skippers of Purse Seine Vessels are independent businessmen... The contention that evidence showing a connection between postseason bonuses and the pounds of fish purchased would be of such weight as to prove, in the face of the record, that the fishermen are in fact employees of individual canners appears to be entirely void of any merit. The regular settlements between skipper and canner are directly related to the pounds of fish purchased, but this fact has not served to indicate the alleged relationship. Even if the bonuses are likewise related to the pounds of fish purchased, why should the result be any different?"

In addition to the fact that this evidence would have no material bearing on the issues, Commissioner Secrest continued, the request is unreasonable in scope, The only basis for requesting extensive documents, including highly confidential business matters, is "the mere speculation that the records may contain evidence to support its defense,"

Elaborating on the relationship of the camers and boatowners, Commissioner Secrest noted that the skippers of the vessels own their gear, and sometimes, their boats, hire their crews, and assume responsibility for withholding taxes and social security payments. They also fish when and where they want to, In addition, he continued, the fact that a canner may hold a mortgage on a vessel has no bearing on the question of control. "The relationship involved," he concluded, "is that of sellers and buyers of fish."

The two agreements which the Commission found are illegal are the "Salmon Agreement" between the union and the canners and the "Working Agreement" between the union and the vessel owners.

The Salmon Agreement, whether executed with the union by one one or all of the canners, has the practical effect of fixing minimum prices paid by only one or all to the vessel owners.

Tied to this agreement is the Working Agreement, providing in part that no boat is allowed to leave for the fishing grounds or be moved from its home port until the price agreements have been signed, "Any vessel violating this section," the Working Agreement provides, "shall be declared unfair,"

The order against the union and the vessel owners prohibits the following activities:

- Entering into "Working Agreements" or "Salmon Agreements" or any others designed to fix the prices of raw or fresh salmon;
- 2. Interfering with the operation of any fishing vessel with the purpose of maintaining any price-fixing agreement.

The order does not prevent any member of the vessel owners' association "acting individually" from negotiating with canners concerning salmon prices. It also does not prevent; any collective bargaining between the union and employers concerning wages, hours, and working conditions of union members; or any association of fishermen from acting in accordance with the Fisheries Cooperative Marketing Act.

The Commission's complaint was filed on June 28, 1955.



Department of the Interior

U.S. FISH AND WILDLIFE SERVICE

REORGANIZATION BECOMES EFFECTIVE:

Secretary of the Interior Fred A. Seaton announced November 6, 1956, that reorganization of the Department's Fish and Wildlife Service, as provided by Public Law 1024 enacted in 1956, became effective as of the close of business on November 5, 1956.

In making the announcement, Secretary Seaton said that appointments have not been made to the two new top-level positions created by the reorganization--Assistant Secretary for Fish and Wildlife and Commissioner of Fish and Wildlife, Appointments to both positions are to be made by the President. They are subject to Senate confirmation.

Two separate bureaus are established under the reorganization as components of the new United States Fish and Wildlife Service, the Bureau of Sport Fisheries and Wildlife and the Bureau of Commercial Fisheries. Details with respect to internal organization and functions will be announced shortly.

Secretary Seaton designated John L. Farley as Acting Director, Bureau of Sport Fisheries and Wildlife, and Arnie J. Suomela as Acting Director, Bureau of Commercial Fisheries. Farley has been Director and Suomela has been

Associate Director of the old Fish and Wildlife Service.

The Bureau of Sport Fisheries and Wildlife will be responsible for matters relating primarily to migratory birds, game management, wildlife refuges, sport fisheries, sea mammals (except whales, seals, and sea lions), and related matters. The Bureau of Commercial Fisheries will be responsible for matters relating primarily to commercial fisheries, whales, seals, and sea lions, and related matters.

Until the new Assistant Secretary and Commissioner are appointed, the two Acting Directors will report directly to the Secretary of the Interior. All funds, records, personnel, and other properties, of the Fish and Wildlife Service have been transferred to the new United States Fish and Wildlife Service, and employees and officers were directed to continue to discharge their duties as before the transfer.

The present reorganization is the first major action of this nature to be undertaken since 1940, when the Bureau of Biological Survey and the Bureau of Fisheries were combined to form the Fish and Wildlife Service in the Department of the Interior. A year earlier the two bureaus had been transferred to Interior from the Departments of Agriculture and Commerce, respectively.

The new post of Assistant Secretary for Fish and Wildlife is the first such position to be created since May 24, 1950, when four Assistant Secretaries were authorized by the Congress to direct the Department's functions in Public Land Management, Water and Power Development, Mineral Resources, and Administration.

The old Fish and Wildlife Service has been under the supervision of the Assistant Secretary for Public Land Management.

The reorganization was described by Secretary Seaton as an important assurance to sportsmen that "the Federal Government is increasing its management efforts" to insure adequate fish and and wildlife resources for recreational purposes. At the same time, he continued, it will help enable the commercial fishing industry attain its proper place in the national economy.

"The greater recognition of fish and wildlife conservation which will result will benefit the entire Nation," the Secretary concluded.

The notice as it appeared in the November 6, 1956, Federal Register follows:

DEPARTMENT OF THE INTERIOR

UNITED STATES FISH AND WILDLIFE SERVICE

REORGANIZATION OF FISH AND WILDLIFE ACTIVITIES, GENERAL PROCEDURES, AND EFFECTIVE DATE OF ESTABLISHMENT

In accordance with the authority vested in the Secretary of the Interior pursuant to section 3, subsection (f) of the Fish and Wildlife Act of 1956 (70 Stat. 1119), the reorganization prescribed by such Act is hereby declared to be effective as of the close of business November 5, 1956.

The United States Fish and Wildlife Service, as prescribed by such Act, consists of a "Bureau of Commercial Fisheries" and a "Bureau of Sport Fisheries and Wildlife." The United States Fish and Wildlife Service succeeds to and replaces the Fish and Wildlife Service of the Department of the Interior.

The functions of the United States Fish and Wildlife Service will be administered under the supervision of the Commissioner of Fish and Wildlife, who will be subject to the supervision of the Assistant Secretary for Fish and Wildlife.

The Bureau of Commercial Fisheries, under a Director, will be responsible for matters relating primarily to commercial fisheries, whales, seals, and sea-lions, and related matters. The Bureau of Sport Fisheries and Wildlife, under a Director, will be responsible for matters relating primarily to migratory birds, game management, wildlife refuges, sport fisheries, sea mammals (except whales, seals and sea-lions), and related matters. Until the positions of Assistant Secretary for Fish and Wildlife are filled, the Directors will report directly to the Secretary.

All funds, positions, personnel, records, and other properties of, or assigned to, the Fish and Wildlife Service are transferred to the United States Fish and Wildlife Service, effective as of the time of its establishment, and the positions to transferred shall be positions in the United States Fish and Wildlife Service. Until further notice, each officer or employee is directed to continue to discharge the duties of, and is empowered

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to continue to exercise the authority previously vested in, such person or in the transferred position which he may hold.

The authority now vested in the Director, Fish and Wildlife Service, expressly, or as the head of a bureau, is hereby and until further notice delegated severally to the Director, Bureau of Commercial Fisheries and the Director, Bureau of Sport Fisheries and Wildlife to the extent that such authority relates to any matter which is the responsibility of the bureau, including any administrative matter. Such authority may not be redelegated.

Section 3, subsection (e) of the Fish and Wildlife Act of 1956, provides: "Except as changed by the terms of this Act or by subsequent laws or regulations, all laws and regulations own in effect relating to matters heretofore administered by the Department of the Interior through the former Fish and Wildlife Service as heretofore existing, shall reman in effect."

FRED A. SEATON, Secretary of the Interior. NOVEMBER 3, 1956.

ORGANIZATION DESCRIBED:

Organizational details of the new United States Fish and Wildlife Service, whose establishment under Public Law 1024 became effective on November 6, 1956, were announced on November 9 by the Secretary of the Interior.

As announced earlier, two new toplevel positions were created by the reorganization to direct the activities of the new Service. Appointments to these new positions, Assistant Secretary for Fish and Wildlife and Commissioner of Fish and Wildlife, will be made by the President, subject to confirmation by the Senate.

Direct supervision will be exercised by the Commissioner over the operations of the two new bureaus, the Bureau of Sport Fisheries and Wildlife and the Bureau of Commercial Fisheries. Each bureau will have a Director, Associate Director, and Assistant Director.

The Commissioner will be responsible also for functions of the Divisions of Administration, Information, and River Basins, each of which will perform services in connection with the work of both the bureaus.

Each of the bureaus will have its office of budget and finance, and each will maintain its regional organizations and research activities in their respective fields of responsibility.

With reference to the Bureau of Sport Fisheries and Wildlife, the organizational details approved by the Secretary state the bureau's objectives as follows:

"To insure the conservation of the Nation's wild birds, mammals, and sport fish, both for their recreational and economic values, with a view to preventing their destruction or depletion and to encourage the maximum present use of the Nation's fish and wildlife resources that is compatible with their perpetuity. This objective is to be achieved by the acquisition and application of fundamental knowledge necessary for intelligent management of fish and wildlife resources so that hunters, anglers, and others may continue to enjoy and use these resources."

Principal components of this bureau are the Division of Sport Fisheries, Division of Technical Services, and Division of Wildlife. Responsibility is vested in this bureau for fish hatcheries, except those operated in connection with the Columbia River fisheries program which are assigned to the Division of River Basins and under the direct supervision of the Commissioner.

The Bureau of Sport Fisheries and Wildlife will be responsible for matters relating primarily to migratory birds, game management, wildlife refuges, sport fisheries, sea mammals (except whales, seals and sea lions), and related matters.

Objectives of the Bureau of Commercial Fisheries are stated as follows:

"To aid in maintaining the welfare of the commercial fisheries of the United States and its Territories by conducting research, investigations, and studies and by providing marketing, informational and other services for the commercial fishing industry and the general public. This objective is to be achieved in consonance with the policy to prevent the destruction and depletion of the Nation's fishery resources and to encourage their maximum utilization for the benefit of the country as a whole."

Principal components of this burreau are the Division of Fisheries Management, Division of Marketing and Technology, and Division of Research. In addition, it has an Office of Loans and Grants to administer the loan program designed to aid the commercial fishing industry.

The Bureau of Commercial Fisheries will be responsible for matters relating primarily to commercial fisheries.

eries, whales, seals, sea lions, and related matters.

* * * * *

FISHERIES LOAN REGULATIONS CHANGED:

An amendment to refinancing provisions of the fisheries loan regulations under the Fish and Wildlife Act of 1956 was announced November 19, 1956, by the Secretary of the Interior Fred A. Seaton.

The amendment is designed to permit refinancing in the case of liens and existing preferred mortages and secured loans in those instances in which "the Secretary deems such refinancing to be desirable" in carrying out the purposes of the Act.

The amendment applies to Section 160.4b (2 and 3) of the regulations carried in the Federal Register October 18, 1956, which set forth the rules concerning the \$10,000,000 revolving fund provided by Congress to bring about a general rehabilitation of fishing vessels and fishing gear, thereby contributing to more efficient and profitable fishing operations.

The initial regulations prohibited the use of loans for paying previously incurred debts. The new regulations provide for marshalling and liquidating of indebtedness of the applicant to existing lien holders at the discretion of the Secretary. They also contain general provisions permitting the use of wider discretion in dealing with refinancing problems.

The amendment as it appeared in the November 17, 1956 Federal Register follows:

TITLE 50-WILDLIFE

Chapter I—Fish and Wildlife Service,
Department of the Interior

Subchapter J—Fisheries Loan Fund
PART 160—LOAN PROCEDURES
OUALIFIED LOAN APPLICANTS

Subparagraphs (2) and (3) of paragraph (b) of § 160.4, are amended to read as follows:

(2) Refinancing existing preferred mortgages and secured loans except in those instances where the Secretary deems such refinancing to be desirable in carrying out the purpose of the act.

(3) Paying creditors for debts previously incurred, except for marshalling and liquidating the indebtedness of the applicant to existing lien holders in those instances where the Secretary deems such action to be desirable in carrying out the purpose of the act.

This amendment shall become effective upon publication in the Federal Register.

(Sec. 4, 70 Stat. 1121)

FRED A. SEATON, Secretary of the Interior.

NOVEMBER 13, 1956.



Department of the Treasury

BUREAU OF CUSTOMS

COMMENTS REQUESTED ON APPRAISAL OF IMPORTED ARTICLES UNDER CUSTOMS SIMPLIFICATION ACT OF 1956:

The Bureau of Customs, Treasury Department, is now preparing a preliminary list of those imported articles the dutiable value of which would be reduced by 5 percent or more under new appraisal procedures established by the Customs Simplification Act of 1956 (Public Law 927, 84th Congress, 70 Stat. 943). A number of fishery products will probably be involved.

This Act, among other things, provides for a change in the method of determining the value of imported goods which are subject to ad valorem duties. In general, the primary basis for determining their dutiable value is to be the "export value" of the article. With certain exceptions this is to replace the present method which provides for ascertaining the "foreign value" of the product—as well as the "export value" and for the duty to be calculated upon the higher of the two.

The new method of appraisal is not to apply to imports of articles on which the Treasury Department finds that the dutiable value would be reduced by 5 percent or more of the average or more of the average value at which such articles were actually appraised during fiscal year 1954. Items determined to be reduced will be published in a preliminary list.

The Bureau of Customs announced in the Federal Register of November 9, 1956, that consideration will be given to any relevant views of interested parties as to why particular articles should appear on the list or as to why particular articles should not appear on the preliminary list even though closely related articles may properly appear on the list.

Upon the publication of the preliminary list, interested parties will then have 60 days in which to present reasons for belief that any imported articles not specified in such list would have been so appraised. The articles involved will be given consideration and if substantiated by investigation, shall be added to the list which shall be published as a final list. Articles on that list will not be appraised under the new valuation provisions. Any article not specified in the final list shall, 30 days after publication, be appraised in accordance with the new valuation provisions of Section 402a, Tariff Act of 1930, as amended by the Customs Simplification Act.

Under the new Act, the export value of imported merchandise shall be the price at the time of exportation to the United States, at which such or similar merchandise is freely sold or, in the absence of sales, offered for sale in the principal markets of the country of exportation, in the usual wholesale quantities and in the ordinary course of trade, for exportation to the United States, plus, when not included in such price, the cost of all containers and coverings, and all other expenses incidental to placing merchandise in condition packed ready for shipment to the United States.

As presently used, the foreign value is the market value or the price at the time of exportation of such merchandise to the United States at which such or similar merchandise is freely offered for sale for home consumption to all purchasers in the principal markets in the country from which exported.

The value includes the cost of all usual containers and coverings, unless otherwise specifically provided for. In addition, the foreign value includes all other costs, charges, and expenses incidental to placing the merchandise in condition, packed ready for shipment to the United States. Ocean freight, marine insurance, consular fee, and any other non-dutiable charges are not included.

The export value under current usage is the market value or the price, at the time of exportation, at which such or similar merchandise is freely offered for sale to all purchasers in the principal markets of the country of exportation for exportation to the United States, plus the costs incidental to placing the merchandise in condition ready for shipment to the United States. If an export value higher than the foreign market value is established by the Customs, the higher value is then regarded as the value of the imported merchandise.



White House

TARIFF COMMISSION'S RECOMMENDATIONS FOR INCREASED DUTIES ON GROUNDFISH FILLETS REJECTED:

The President announced that he has decided against a tariff increase as recommended by the United States Tariff Commission in the groundfish fillets "escape clause" case, a December 10, 1956, news release from the White House states.

The President, in identical letters to the Chairmen of the Senate Finance and House Ways and Means Committees, said he "was not persuaded that, on balance, the proposed duty increase would constitute a sound step in resolving" the difficulties confronting the domestic groundfish fishing industry. "Because of that conviction," the President continued, "I have decided in view of all of the factors bearing on this case that I cannot accept the Tariff Commission's recommendations."

The text of the President's letters to the Chairmen of the Senate Finance

and House Ways and Means Committees is as follows:

"Dear Mr, Chairman:

"On October twelfth the United States Tariff Commission, pursuant to Section 7 of the Trade Agreements Extension Act of 1951, as amended, submitted to me a report of its findings and recommendations in the groundfish fillets "escape clause" case. The Commission found, as a result in part of the cuserons treatment reflecting the trade agreement concession applying to these products, that they are being imported into the United States in such increased quantities as to cause serious injury to the domestic industry. The Commission accordingly recommended that those imports of groundfish fillets presently dutiable at $1\frac{\pi}{8}\phi$ per pound should be dutiable at 2.8125 ϕ per pound, and that those dutiable at $2\frac{\pi}{2}\phi$ per pound, per pound should be dutiable at 3.75 ϕ per pound.

"It is the Tariff Commission's responsibility in these matters to investigate and report to the President any finding of serious injury or threat of serious injury within the meaning of the law. It is the President's responsibility, on the other hand, to consider not only the question of injury and measures recommended for its relief, but also all other pertinent factors bearing on the security and well-being of the nation.

"As an aspect of national policy dedicated to fostering the security and economic growth of the United States, this nation seeks to encourage in all feasible ways the continued expansion of beneficial trade among the free nations of the world. In view of this policy I am, as I have said before, reluctant to impose a barrier to our trade with friendly nations unless such action is essential and clearly promising of positive, productive results to the benefit of the domestic industry in question, My reluctance to impose such a barrier is heightened in this case because the other nations concerned are not only our close friends, but their economic strength is of strategic importance to us in the continuing struggle against the menace of world communism,

"I have analyzed this case with great care, I am fully aware that the domestic groundfish fishing industry is faced with serious problems, but I am not persuaded that, on balance, the proposed duty increase would constitute a sound step in resolving those difficulties. Because of that conviction, I have decided in view of all of the factors bearing on this case that I cannot accept the Tariff Commission's recommendations. It might well be, in fact, that the proposed duty increase would only further complicate the industry's basic problems,

"Over the years, the consumption of groundfish fillets has shown a persistent upward trend, consumption rising to a record level in 1955. This trend is expected to continue; the United States, by all indications is heading toward a further increased population and a greater expansion of its economy. If, as this growth takes place, there is a proportionate increase in requirements for fish and fish products in the United States, the domestic demand for these products will more than exceed the present combined total of domestically caught fish plus imports. This is an encouraging prospect which the domestic industry should prepare to exploit.

"At the same time, I recognize that beset as it is with problems ranging from the age of its vessels to competition with other food products, the fishing industry of the United States will experience difficulties in the years ahead, despite the bright prospects for increased consumption of fish and fish products, unless bold and vigorous steps are taken now to

provide root solutions for the industry's problems. To this end, the Administration last year proposed and I signed into law several bills designed to assist the industry in improving its competitive position. These laws include provisions for increased funds for research and market development programs, educational grants, and a \$10 million revolving loan fund for vessel and equipment improvement purposes.

"The Administration's examination into the industry's problems has continued beyond the enactment of these laws. These studies, in which we are benefitting from consultations with State and local officials and private groups, look toward the development of additional opportunities for promoting the well-being and sound management of all of our fish and wildlife resources, including our commercial fish-

eries resources. These further efforts should be of assistance to the domestic groundfish fishing industry in its search for solutions to the fundamental problems it faces. They should also help the industry to improve its position without the imposition of further trade restrictions which might actually discourage needed improvements.

"This approach is consistent with our objective of achieving a dynamic, expanding, free enterprise economy and also accords with our national policy of seeking the highest attainable levels of mutually profitable and beneficial trade and investment among the countries of the free world,"

/s/ Dwight D. Eisenhower

CONVALESCING VETERANS HAVE "GET WELL" OPPORTUNITIES THROUGH FISHING

A program called "fishery management assistance to Veterans Administration hospitals" may be just "part of the job" for the biologists of the U. S. Fish and Wildlife Service but it is a light in the dark for many veterans, young and old, who are attempting to recover from the rigors of war.

For "fishery management assistance" made it possible for the Veterans Administration hospital at Downey, Ill., to develop a half-acre pond into a fishing spot which afforded the patients 3,000 fishing visits during a single season. In another case, assistance was rendered when the Temple, Tex., veterans facility was developing a 12-acre lake which will mean fishing recreation to hundreds of veterans who are convalescing. At the Northampton, Mass., veterans installation, it means a chance for patients to take catchable-size trout which the Fish and Wildlife Service plants there annually.

Hospital officials have repeatedly declared that they regard fishing as "extremely beneficial to patients" and in many instances Veterans Administration officials have asked for technical help in stream and pond development. In the period 1951-1955, the Fish and Wildlife Service responded to requests for help at 45 of these installations. In most instances, some improvement of opportunities for recreational fishing was possible.

The amount and kind of technical aid given depends upon conditions. The Fish and Wildlife Service supplies no funds for necessary development. Financing and getting the work done is the responsibility of the Veterans facility and is often accomplished with the help of interested local groups. But the Service does provide, in addition to technical guidance for fishery development, such hatchery fish as may be required for the management programs.

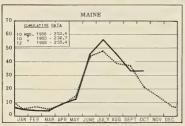
Not all the assistance to Veterans Administration hospitals is given on hospital property, for many times there are no fishing waters on the hospital grounds. When suitable water is found within a reasonable distance—and when the veterans are assured the right to fish and transportation facilities are available for them—the Fish and Wildlife Service applies the necessary management practices to that water.

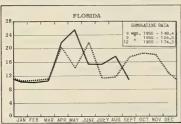
In many instances the state fish and game department and the Fish and Wildlife Service cooperate on projects; in others, where survey of the problems shows that the state agency can do the job more easily because of nearby facilities, the task is turned over to the state.

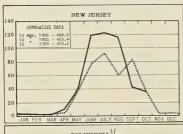


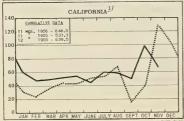
CHART I - FISHERY LANDINGS for SELECTED STATES

In Millions of Pounds Legend:

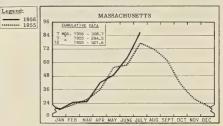


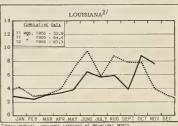






1/ONLY PARTIAL--INCLUDING PRODUCTION OF MAJOR FISHERIES AND MARKET FISH LANDINGS AT PRINCIPAL PORTS.





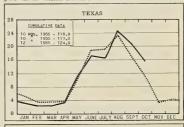
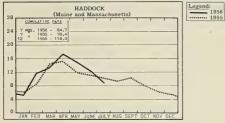
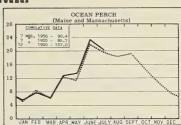




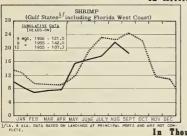
CHART 2 - LANDINGS for SELECTED FISHERIES

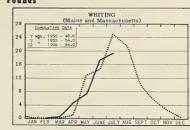




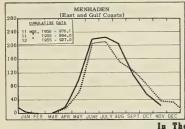


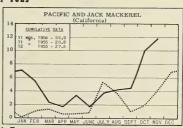
In Millions of Pounds





In Thousands of Tons





In Thousands of Tons



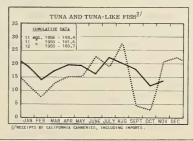
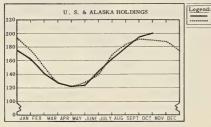
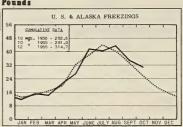
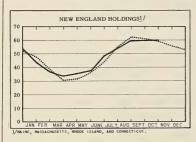


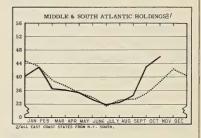
CHART 3 - COLD-STORAGE HOLDINGS and FREEZINGS of FISHERY PRODUCTS *

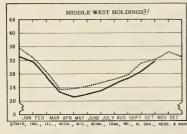


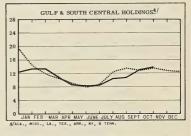


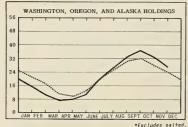










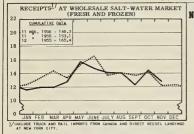




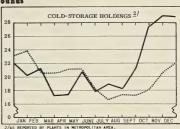
*Excludes salted, cured, and smoked products.

CHART 4 - RECEIPTS and COLD-STORAGE HOLDINGS of FISHERY PRODUCTS at PRINCIPAL DISTRIBUTION CENTERS

In Millions of Pounds

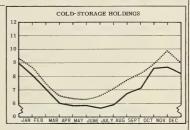


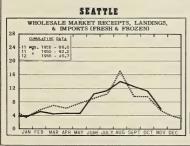
NEW YORK CITY





CHICAGO





<u>Legend</u>:

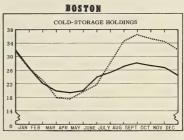
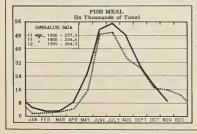


CHART 5 - FISH MEAL and OIL PRODUCTION - U.S and ALASKA



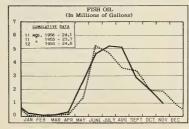
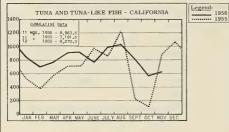
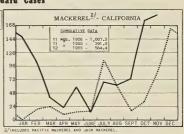
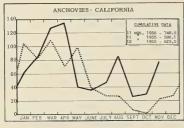


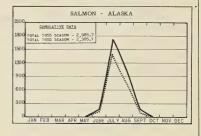
CHART 6 - CANNED PACKS of SELECTED FISHERY PRODUCTS

In Thousands of Standard Cases



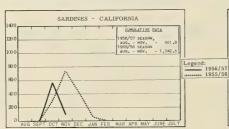






1400_	SARDINES (ESTIMATED) - MAINE
1300	CUMULATIVE DATA
1200	12 Mgs. 1956 - 2,221.6 12 1955 - 1,268.8
1000	
800	
600	
400	
200	
OL	JAN FEB MAR APR MAY JUNE JULY AUG SEPT OCT NOV DEC

STANDARD CASES					
Variety	No. Cans	Can Designation	Net W	/gt	
SARDINES	100	1 drawn	31/4	oz.	
SHRIMP	48		5	oz	
TUNA	48	No. ½ tuna	6 & 7	oz.	
PILCHARDS	48	No. 1 oval	15	oz.	
SALMON	48	1-pound tall	16	oz,	
ANCHOVIES	48	½ lb.	8	oz.	



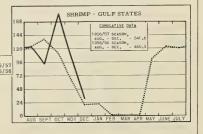
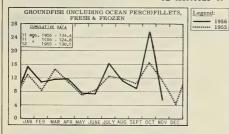


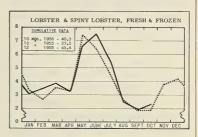
CHART 7 - U.S. FISHERY PRODUCTS IMPORTS

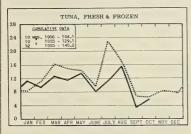


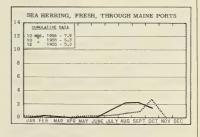


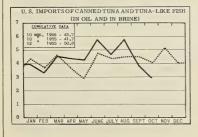


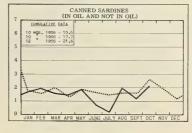














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AND ALASKA,

SSR. - FISH. - SPECIAL SCIENTIFIC REPORTS - FISHERIES
(LIMITED DISTRIBUTION),

SEP. - SEPARATES (REPRINTS) FROM COMMERCIAL FISHERIES

REVIEW.

Number Title

CFS-1413 - Fish Stick Report, July to September 1956, 2 pp.

CFS-1416 - North Carolina Landings, August 1956, 2 pp.

CFS-1420 - Texas Landings (Revised), August 1956, 3 pp.

CFS-1421 - Frozen Fish Report, September 1956, 8 pp.

CFS-1422 - Florida Landings, July 1956, 6 pp. CFS-1425 - Mississippi Landings, July 1956, 2 pp. CFS-1426 - Massachusetts Landings, June 1956,

CFS-1427 - Ohio Landings, September 1956, 2 pp. CFS-1428 - Fish Meal and Oil, September 1956,

2 pp. CFS-1429 - Shrimp Landings, August 1956, 4 pp. CFS-1430 -Alabama Landings, August 1956, 2 pp. CFS-1431 - North Carolina Landings, September

1956, 2 pp. CFS-1432 - Georgia Landings, September 1956, 2 pp.

CFS-1433 - Texas Landings (Revised), September 1956, 3 pp.

CFS-1434 - Mississippi Landings, August 1956, 2 pp.

CFS-1435 - Frozen Fish Report, October 1956, 8 pp.

CFS-1436 - California Landings, July 1956, 4 pp. CFS-1438 - New York Landings, August 1956,

4 pp. CFS-1439 - New York Landings, September 1956, 4 pp.

CFS-1443 - Maine Landings, September 1956, 3 pp.

Sep. No. 454 - Development of Markets for Underutilized Lake Erie Fish--Progress Report.

Sep. No. 455 - Correlation of pH and Quality of Shucked Southern Oysters.

Sep. No. 456 - Cold-Storage Life of Fresh-Water Fish--No. 3 (Lake Herring, Northern Pike, and Whitefish),

Cold Storage Studies on Gulf of Mexico Yellowfin Tuna. Sep. No. 457 -Fungicidal Properties of Modified Unsaturated Fish Oils.

Sep. No. 458 - North Atlantic Shrimp Keeping Quality in Cold Storage.

Sep. No. 459 - Technical Note No. 34 - Growth Characteristics of the Pink Yeast that Causes Discoloration of Oysters.

SSR-Fish. No. 174 - Size Variation of Central and Western Pacific Yellowfin Tuna, by Edwin S. Iversen, 28 pp., illus., processed, June 1956. SSR-Fish. No. 183 - Observations on Serology of

Tuna, by John E. Cushing Jr., 17 pp., processed, October 1956. (Also Contribution Hawaii Marine Laboratory No. 85.)

SSR-Fish, No. 187 - Commercial and Sport Shad Fisheries of the Edisto River, South Carolina, 1955, by Charles H. Walburg, 9 pp., illus., processed, October 1956. Describes the Edisto River, South Carolina, shad fishery investigations to determine fishing effort, fishing rate, total catch, size of run, and spawning escapement for 1955. The commercial fishery catch-and-effort data were obtained from logbooks kept by each fisherman. The total catch made by sport fishing was determined by a post-card survey. The catch-andeffort data were combined with a tagging and recovery program, and it was estimated that the fishing rate was approximately 20 percent, the total catch was 11,000 shad, and the size of the run was 56,000 shad (fiducial limits 28,000 to 100,000). Unfortunately, catch-andeffort records for previous years were not available for this stream; therefore, sizes of former runs and escapements could not be determined.

THE FOLLOWING SERVICE PUBLICATIONS ARE AVAILABLE ONLY FROM THE SPECIFIC OFFICE MENTIONED.

California Fisheries Trends and Review for 1955, by V. J. Samson, 38 pp., processed. (Available free from the Market News Service, U.S. Fish and Wildlife Service, Post Office Bldg., San Pedro, Calif.) This is a review of the 1955 trends and conditions in the California fisheries. Among the subjects discussed are the tuna fishery (cannery receipts, total pack for 1946-1955, ex-vessel prices, domestic catch and fishing conditions, imports of frozen tuna, and canned tuna market conditions and price quotations); California sardine (pilchard) fishery (landings, ex-vessel prices, canned pack, and canned sardine prices); mackerel fishery (cannery receipts and ex-vessel prices); anchovy fishery; and canned pet-food production. Included in the statistical tables are data on tuna receipts and canned pack by months and species; landings and products of sardines (pilchards) by months, products, and areas; landings and pack of mackerel and jack mackerel by species and months; production of miscellaneous fishery products; freezing of fish and shellfish; cold-storage holdings; landings of market fish and shellfish at certain

California ports; and imports of fishery products into California and Arizona.

- Gulf States Production of Fishery Products for Se-lected Areas, 1955, by L. A. Keilman, 26 pp., processed, December 1956, (Available free from the U. S. Fish and Wildlife Service, 609-611 Federal Bldg., 600 South St., New Orleans 12, La.) The author discusses trends and conditions in Gulf Coast fisheries during 1955 and gives a resume of the individual fisheries. For the shrimp fishery a detailed account is given of general conditions, total landings, composition of the landings by species, increase in consumption, prices, canned shrimp, and data on cold-storage freezings and holdings. Production and market conditions for the oyster, blue crab, and finfish fisheries are included in the summary, as well as significant developments in these fisheries. Imports of fresh and frozen fish are briefly mentioned. Statistical tables show shrimp closed seasons in effect in Gulf states in 1955; minimum shrimp size regulations; conversion factors and container capacities; shrimp sizes; total landings by area; total landings of selected areas and species by months; fishery imports through the New Orleans Custom District and Port Isabel and Brownsville, Texas; and weekly canned oyster and shrimp packs. Included also are tables showing the monthly range of wholesale prices of fishery products on the New Orleans French Market, a summary of Gulf shrimp landings for selected areas, monthly LCL shipments from New Orleans by month and by destination, and fishery products market classifications in the Gulf area. The areas covered by the report are: Mobile and Bayou LaBatre, Ala.; Pascagoula and Biloxi, Miss.; New Orleans and lower Mississippi River area, Golden Meadow area, Houma, Chauvin, Dulac, Morgan City, Berwick, Patterson, and Delcambre, La.; Galveston, Freeport, Port Lavaca, Palacios, Aransas Pass, Rockport, Corpus Christi, Port Isabel, and Brownsville, Tex.
- Receipts of Fresh and Frozen Fishery Products at Chicago, 1955, by G. A. Albano, 53 pp., processed, November 1956. (Available free from the Market News Service, U. S. Fish and Wildlife Service, 565 West Washington St., Chicago 6, Ill.) This report presents an analysis of the marketing trends for fresh and frozen fishery products and statistical tables on the receipts of fresh and frozen fish and shellfish at Chicago during 1955. Statistics on arrivals of fishery products at Chicago are presented by species and by states and provinces of origin; states and provinces by species; species by months; states and provinces by months; totals by species; and totals by states and provinces. Receipts are tabulated by methods of transportation (truck, express, and freight). A table shows the monthly range of wholesale prices of some of the leading varieties of fresh and frozen fishery products handled on the Chicago market. In the analysis of the marketing trends for fresh and frozen fishery products at Chicago, the author discusses the sources of the receipts, methods of transportation, months of greatest receipts, receipts by species and varieties, lake trout and whitefish receipts.

- U. S. Great Lakes fishery production, U. S. imports of fresh and frozen fish from Canada, U. S. imports of frozen fillets and cold storage inventories. Also included is a table giving the names, classifications, and approximate weights of certain fishery products sold in the Chicago wholesale market.
- Boston Fishery Products Monthly Summary, September 1956, 15 pp.; Boston Fishery Products Monthly Summary, October 1956, 15 pp. (Market News Service, U. S. Fish and Wildlife Service, 10 Commonwealth Pier, Boston 10, Mass.) Landings and ex-vessel prices by species for fares landed at the Boston Fish Pier and sold through the New England Fish Exchange; and Boston frozen fishery products prices to primary wholesalers; for the months indicated.
- (Chicago) September 1956 Monthly Summary of Chicago's Fresh and Frozen Fishery Products Receipts and Wholesale Market Prices, 10 pp. (Market News Service, U. S. Fish and Wildlife Service, 565 W. Washington St., Chicago 6, III.) Receipts at Chicago by species and by states and provinces; fresh-water fish, shrimp, and frozen fillet wholesale market prices; for the month indicated.
- Gulf Monthly Landings, Production, and Shipments of Fishery Products, October 1956, 5 pp. (Market News Service, U. S. Fish and Wildlife Service, 609-611 Federal Bldg., New Orleans 12, La.) Gulf States shrimp, oyster, finfish, and blue crab landings; crab meat production; LCL express shipments from New Orleans; and wholesale prices of fish and shell-fish on the New Orleans French Market; for the month indicated.
- Monthly Summary of Fishery Products Production in Selected Areas of Virginia, North Carolina, and Maryland, October 1956, 4 pp. (Market News Service, U. S. Fish and Wildlife Service, 18 S. King St., Hampton, Va.) Fishery production for the Virginia areas of Hampton Roads, Lower Northern Neck, and Eastern Shore; the Maryland areas of Crisfield, Ocean City, and Cambridge; and the North Carolina areas of Atlantic, Beaufort, and Morehead City; together with cumulative and comparative data; for the month indicated.
- (New York) Monthly Summary September 1956 Receipts of Fishery Products at the New York City Wholesale Salt-Water Market, 4 pp. (Market News Service, U. S. Fish and Wildlife Service, 155 John St., New York 38, N. Y.) Receipts in the salt-water section of the Fulton Fish Market by species and by states and provinces for the month indicated.
- (Seattle) Monthly Summary Fishery Products,
 October 1956, 6 pp. (Market News Service,
 U. S. Fish and Wildlife Service, 421 Bell St.
 Terminal, Seattle 1, Wash.) Includes landings
 and local receipts, with ex-vessel and wholesale prices in some instances, as reported by
 Seattle and Astoria (Oregon) wholesale dealers;
 also Northwest Pacific halibut landings.

Progress in Developing Methods for Chemical Control of Molluscan Enemies, by V. L. Loosanoff, vol. 20, Bulletin No. 12, November 7, 1956, 5 pp., processed. (Available free from the Fish and Wildlife Service, Marine Biological Laboratory, Milford, Conn.) Answers requests for more information concerning the development of methods for chemical control of shellfish enemies. Discussed briefly are the effects of various chemicals on molluscan enemies, methods of using chemicals, effects of chemicals on useful animals, and significance of the application of the methods being developed.

THE FOLLOWING SERVICE PUBLICATIONS ARE FOR SALE AND ARE AVAILABLE ONLY FROM THE SUPERINTENDENT OF DOCUMENTS, WASHINGTON 25, D. C.

Comparative Study of Food of Bigeye and Yellowfin Tuna in the Central Pacific, by Joseph E. King and Isaac I. Ikehara, Fishery Bulletin 108 (from Fishery Bulletin of the Fish and Wildlife Service, vol. 57), 26 pp., illus., printed, 30 cents, 1956.

Propagation and Distribution of Food Fishes for the Calendar Years 1953-1954, Statistical Digest 38, 39 pp., printed, 20 cents, 1956.

This is a Salmon Hatchery (Circular 25), This is a Trout Hatchery (Circular 31), This is a Pond-fish Hatchery (Circular 40); pamphlets each 2 pp., illus., printed, 5 cents. The purpose of the circulars is to portray in a quick, easy-toread manner the function, operation and physical features of each of the three types of hatchery. Each circular is illustrated with photographs of a typical hatchery and with artist's drawings which portray the life cycle of various fish and some of their physical characteristics. Hatchery operations are shown by both photograph and drawings. The circulars show that the pondfish hatchery is a group of rearing ponds, each about an acre in extent, while trout and salmon hatcheries have batteries of concrete raceways or rearing ponds each about 8 feet by 80 feet in area. A feature of some salmon hatcheries is the fish ladder from the stream to spawning and holding ponds in addition to the concrete raceways. Each leaflet explains the cultural methods used for the species and the manner in which the hatchery product helps solve the particular fishery problem. The pondfish produced are mostly largemouth bass and blue gills and, to a lesser extent, other warm-water fish like smallmouth bass, redear sunfish, northern pike, walleye, and channel catfish. Rainbow, brown, cutthroat and brook trout provide much of the sport fishing in the United States and account for most of the production from trout hatcheries. There are five species of salmon native to the Pacific area, the king (chinook, spring); red (sockeye, blueback); silver (coho); chum (dog) and pink (humpback). All species except pink salmon are reared in Federal hatcheries in the Northwest. In some instances there are facilities for both trout and pondfish culture at the same hatchery and in others the salmon and trout are reared in a single installation.

MISCELLANEOUS PUBLICATIONS

Abstract of Commercial Fisheries Laws of California, 1955-1957, folder, 2 pp., printed, Department of Fish and Game, Sacramento 14. Calif.

"Age Determination in Yellowstone Cutthroat
Trout by the Scale Method," by Martin Laakso
and Oliver B. Cope, article, The Journal of
Wildlife Management, vol. 20, no. 2, April
1956, single copy \$2. Cayuga Press, Inc.,
113 East Green St., Ithaca, N. Y.

Annual Report--Passage of Fish over Bonneville and McNary Dams, Columbia River, Oregon and Washington, 1955, Reports Control Symbol NPDGW-79, Chief of Engineers, U. S. Army, Washington 25, D. C.

Beretning om Selfangsten, Hakjerringfisket og
Overvintringsekspedis jonene i 1955 (Reporton
Sealing, Greenland Shark Fishing, and Winter
Expeditions in 1955), Arsberetning Vedkommende Norges Fiskerier, 1955, Nr. 10, 23
pp., printed in Norwegian. A. S. John Griegs
Boktrykkeri, Bergen, Norway, 1956

The Boring Sponges which Attack South Carolina
Oysters, with Notes on Some Associated Organisms, by Sewell H. Hopkins, Contributions
from Bears Bluff Laboratories No. 23, 30 pp.,
illus., printed, Bears Bluff Laboratories,
Wadmalaw Island, S. C., October 1956.

Bulletin Officiel D'Information du Conseil Superieur de la Peche (Official Information Bulletin of the Council on Fisheries), No. 25, July-August-September 1956, 93 pp., printed in French. Conseil Superieur de la Peche, 1 Avenue de Lowendal, Paris, France.

(Canada) Ninth Annual Report of the Fisheries
Prices Support Board for the Year 1955-56,
10 pp., printed. Queen's Printer and Controller of Stationery, Ottawa, Canada, 1956.
Describes the Fisheries Prices Support Act;
economic conditions of the British Columbia,
Atlantic Coast, and fresh-water fisheries;
price support program for Newfoundland salted codfish; request for assistance in the destruction of Pacific Coast dogfish; and other
activities of the Board.

Changes in the Physiography of Oyster Bars in the James River, Virginia, by Nelson Marshall, Contribution No. 17, 10 pp., illus., printed. (Reprinted from The Virginia Journal of Science, vol. 5, New Series, no. 3, July 1954, pp. 173-181.) The Oceanographic Institute, Florida State University, Tallahassee, Fla.

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATIONS ISSUING THEM.

- The Charles F. Johnson Oceanic Gamefish Investigations, Summary of Investigations for the Period Comprising September, 1955 through August, 1956, by Gilbert L. Voss, Progress Report No. 2, 11 pp., processed. The Marine Laboratory, University of Miami, Coral Gables, Fla. A summary of investigations of the systematics, geographical distribution, ecology, food, migrations, spawning, and growth of the billfishes (including spearfishes, marlins, and the swordfish).
- Cod Populations Identified by a Chemical Method, by Eva Henly Dannevig, Fiskeridirektoratets Skrifter (Report on Norwegian Fishery and Marine Investigations, vol. XI, no. 6), 13 pp., illus., printed. A. S. John Griegs Boktrykkeri, Bergen, Norway, 1956. Gives the results of a study of the proteins of fish muscle. The chemical composition of the muscle of cod varies according to the different localities. First, there is a very definite difference in the chromatographic pattern of cod muscle between cod from the southern waters (Skagerack) and those from northern waters (Lofoten area). This difference occurred in all specimens examined, irrespective of local varieties. Secondly, the cod from the two localities can be separated in subgroups. Finally, the cod mus-cle has been hydrolyzed, and the different constituents building the complex molecules of the amino-acid group containing part of the muscle are identified.
- "Correlations of Various Ambient Phenomena with Red Tide Outbreaks on the Florida West Coast," by Anita Feinstein, article, Bulletin of Marine Science of the Gulf and Caribbean, vol. 6, no. 3, September 1956, pp. 209-232, illus., printed. The Marine Laboratory, University of Miami, Coral Gables 34, Fla.
- "The 'Critical Period' in the Early Life History of Marine Fishes," by John C. Marr, article, Journal du Conseil, vol. XXI, no. 2, April1956, pp. 160-170, illus., printed; single copy Kr. 12.00 (US\$2.32). Andr. Fred. Høst & Søn, Bredgade, Copenhagen, Denmark.
- The Distribution of Fishes Found Below a Depth of 2,000 Meters, by Marion Grey, Fieldiana:

 Zoology, vol. 36, no. 2, 263 pp., printed, \$4. Chicago Natural History Museum, Roosevelt Rd. and Lake Shore Dr., Chicago 5, Ill.
- El Agricultor Venezolano (The Venezuelan Farmer),
 vol. XXI, no. 190, August-September 1956,
 78 pp., illus., printed in Spanish. Ministerio
 de Agricultura y Cria, Caracas, Venezuela.
 Contains, among others, the following articles:
 "Fishing in Venezuela," "Oceanography of the
 Central Region," "20 Years of the Department
 of Fishery," "Pearl Fishing," and "The Fish
 Service Provided by the Ministry of Agriculture and Livestock,"
- "Fish in the Mink Diet," article, Trade News, vol. 9, no. 3, September 1956, pp. 6, 12, illus., printed. Department of Fisheries of Canada, Ottawa, Canada. An interesting development in British Columbia is the increasing use of

- fish as a food for mink. This increase is due to its availability and price in comparison to other animal foods, its nutritive value, and to the growth in the number of mink ranchers in the province during recent years. This article describes a study of the subject made by the Markets and Economics Service of the Department of Fisheries.
- Fishes from Eylath (Gulf of Aqaba), Red Sea, Second Report, by H. Steinmetz and A. Ben-Tuvia, Bulletin No. 11, December 1955, 11 pp., printed. The Government Printing Press, Haifa, Israel.
- Fiskeri-Undervisningen, 1954-55 (Risheries Training, 1954-55), Arsberetning Vedkommende Norges Fiskerier, 1955, Nr. 8, 37 pp., illus., printed in Norwegian. A. S. John Griegs Boktrykkeri, Bergen, Norway, 1956.
- Fiskeriinspektorenes Virksomhet 1/7 1953--31/12
 1954 (Activities of Fisheries Inspectors, July
 1, 1953--December 31, 1954), Arsberetning
 Vedkommende Norges Fiskerier, 1955, Nr.
 11, 139 pp., printed in Norwegian. A. S.
 John Griegs Boktrykkeri, Bergen, Norway,
 1956.
- (FAO) Conservation et Distribution des Produits de la Peche (Preservation and Distribution of Fish Products), by Giorgio Ricci, Technical Paper No. 43, 10 pp., processed in French with brief abstract in English. Food and Agriculture Organization of the United Nations, Viale delle Terme di Caracalla, Rome, Italy. A paper presented at the Fourth Meeting of the General Fisheries Council for the Mediterranean held in Istanbul September 17-22, 1956, covering the use of ice in the preservation of fish, refrigeration equipment, quick-freezing, distribution of refrigerated fishery products, retail stores, and distribution of frozen fishery products.
- (FAO) Transport of Fish for Short Trips by Seaat Medium Temperature, by Selim R. Suntur, Technical Paper No. 47, 4 pp., processed, Food and Agriculture Organization of the United Nations, Viale delle Terme di Caracalla, Rome, Italy. A paper presented at the Fourth Meeting of the General Fisheries Council for the Mediterranean held in Istanbul September 17-22, 1956.
- Gremio dos Armadores da Pesca da Baleia, Relatorio e Contas do Exercicio de 1955 e Orcamento para 1956 (Whaling Vessel Owners' Guild, Statement of Operations for 1955 and Budget for 1956), 28 pp., illus., printed in Portuguese. A Comissao Revisora de Contas, Lisbon, Portugal.
- Gremio dos Armadores da Pesca da Sardinha, Relatorio e Contas do Exercicio de 1955 e Ocramento para 1956 (Sardine Fishing Vessel Owners' Guild, Statement of Operations for 1955 and Budget for 1956), 15 pp., printed in Portuguese. A Comissao Revisora de Contas, Lisbon, Portugal.

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- Gremio dos Armadores de Navios da Pesca do Bacalhau, Relatorio e Contas do Exercicio de 1955 e Orcamento para 1956 (Cod Fishing Vessel Owners' Guild, Statement of Operations for 1955 and Budget for 1956), 28 pp., printed in Portuguese. A Comissao Revisora de Contas, Lisbon, Portugal.
- Inter-American Tropical Tuna Commission Annual Report for the Year 1955 (Comision Interamericana del Atun Tropical Informe Anual Correspondiente al Ano 1955), 95 pp., illus., printed in English and Spanish, Inter-American Tropical Tuna Commission, La Jolla, Calif., 1956. Included in this report are: the recommended program of investigations; progress on investigations; publication of research results; activities of the Tuna Commission at the International Technical Conference on the Conservation of the Living Resources of the Sea; and a short resume of the Commission's regular annual meeting at Panama City, Panama, on July 14, 1955. An appendix to the report describes the investigations conducted by the Commission during 1955, and discussed in this section are the compilation of current statistics of total catch, amount and success of fishing, and abundance of fish populations; compilation and analysis of historical data on tuna and bait fishes; research on biology, life history, and ecology of tunas; investigation of the oceanography of the Eastern Pacific; and investigations of the biology, ecology, and life history of bait fishes. The Commission has the purpose of gathering and interpreting the factual information required for maintaining the populations of tuna and tuna bait fishes at such levels which will permit maximum sustainable catches year after year.
- Kieler Meeresforschungen (Marine Investigations), Band XII, Heft 2 (vol. XII, no. 2), 1956, pp. 127-260, illus., printed in German. Institut fur Meereskunde der Universität, Hohenbergstr. 2, Kiel, Germany. Contains nine articles on various subjects including biological, historical, oceanographic subjects, and problems observed in various parts of the world.
- "The Lamprey in New York Waters," by John R. Greeley, article, The New York State Conservationist, vol. 11, no. 1, August-September 1956, pp. 18-21, illus., printed, single copy 50 cents. The Conservationist, Room 515, Arcade Bldg., Albany 1, N.Y.
- Lofotfisket 1955 (Lofoten Fisheries, 1955), Arsbertning Vedkommende Norges Fiskerier, 1955, Nr. 5, 96 pp., printed in Norwegian. A. S. John Griegs Boktrykkeri, Bergen, Norway, 1956.
- Memoirs of the Faculty of Fisheries, Kagoshima University, vol. 3, 70. 2, 88 pp., illus., printed in Japanese with summaries in English. The Faculty of Fisheries, Kagoshima University, Kagoshima, Japan, May 1954. Contains among others the following articles: "On the Fisheries of Tuna and the Oceanographic Conditions in the Sawu Sea;" "Studies on the Relation Between the Fluctuation in Catch and the

- Environmental Factors of the Principal Fisheries in Kagoshima Bay. I. On the Water-Temperature and Salinity Concerning the Catch 'Maiwashi,' Sardinia melanosticta, and 'Urume,' Etrumeus micropus;" "Studies on the Horizontal Finding of Fish School. (III) About Errors of 'Reading' on the Records of General Fish Finder;" "On the Variation of Free-Tyrosine Content of Fish Meat in Decrease of Its Freshness--II. Estimation of Tyrosine Value under Application of Xanthoproteic Reaction;" "Chemical Studies on the Fixative Procedure of Fish Meat for the Various Estimation -- I. (1) On the Fixative Procedure for the Estimation of Volatile Basic Nitrogen. (a) Fixation by Using Protein Precipitant;" "Study on the Separating Process of Histamin from Histidine by the Electro-Chromatographic Method;" "Biochemical Studies on the Mould Isolated from Katsuobushi--I. On the Antibiotic Action of the Mould;" "A Survey on the Constitutional Transformation of a Fishing Village;" and "An Interpretation of the Developmental Process of Fishery Economy in Japan --Especially a Consideration on the Bonito Fishery at Bonotsu.'
- Memoirs of the Faculty of Fisheries, Kagoshima University, vol. 4, 159 pp., illus., printed in Japanese with summaries in English. The Faculty of Fisheries, Kagoshima University, Kagoshima, Japan, December 1955. Contains among others the following articles: "Studies on the Improvement of Yellow-tail Setting Net (II), Model Experiment on Trap Nets of Variant Constructions;" "On the Curve of Tuna Long Line;" "Studies on the Relation Between the Fluctuation in Catch and the Environmental Factors of the Principal Fishes in Kagoshima Bay-II. In the Fisheries of Istiophorus orientalis and Sea Conditions;" "On the Detective Effect of the Radar Upon the Location of the Tunny Longline;" "An Experiment on the Trial Manufacture of Lead Plate Depth Finder for Fishing Tools;" "Fundamental Studies on the Relation of Underwater Sound to the Fish Behaviour. (I) About the Sounds by Dropping or Showering;" and "Chemical Studies on the Fixative Procedure of Fish Meat for the Various Estimations. (II) On the Fixative Procedure for the Estimation of Volatile Basic Nitrogen, b. On the Volatile Nitrogen Produced in Fish Meat Fixed in Acidic Protein Precipitant."
- The Migration and Exploitation of the Black Mullet,
 MUGIL CEPHALUS L, in Florida, as Determined from Tagging During 1949-1953, by
 Gordon C. Broadhead and H. P. Mefford,
 Technical Series No. 18, 32 pp., illus.,
 printed, The Marine Laboratory, University
 of Miami, Coral Gables, Fla., April 1956.
- The Movement and Recovery of Tagged Walleyes in Michigan, 1929-1953, by Paul H. Eschmeyer and Walter R. Crowe, Miscellaneous Publication no. 8, 32 pp., illus., printed. Institute for Fisheries Research, Ann Arbor, Mich., 1955.
- "The Occurrence of Gymnodinum brevis in the Western Gulf of Mexico," by W. B. Wilson

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and S. M. Ray, article, Ecology, vol. 37, no. 2, p. 388, printed, April 1956, single copy \$2. Duke University Press, Box 6697, College Station, Durham, N. C.

- (Oregon) Biennial Report of the Fish Commission of the State of Oregon to the Governor and the Forty-Eighth Legislative Assembly, 1955, 28 pp., printed. Oregon Fish Commission, 307 State Office Bldg., Portland 1, Ore. A report of the operation of the Fish Commission of the State of Oregon together with a financial statement for the period July 1, 1952, to June 30, 1954. It describes the efforts of the Fish Commission which have been directed toward increasing the effectiveness of the fisheries management activities. This has been done by improved operating methods and the construction of new facilities. This report also shows the pack of canned salmon on the Columbia River from the inception of the industry to
- "Organoleptic Studies of Irradiated Foods," by G. B. Pratt and O. F. Ecklund, article, Food Technology (Published by the Institute of Food Technologists), vol. 10, no. 10, October 1956, pp. 496-499, printed. The Garrard Press, 119 West Park Ave., Champaign, Ill. Discusses and gives results of organoleptic studies of irradiated meats and vegetables. Statistical analysis of taste test scores showed significant off-flavor in each of the irradiated meats and vegetables in the experiment. In every case important changes in appearance or flavor developed on storage. According to the authors, some of these changes, but by no means all, might be attributed to enzymatic action.
- Oyster Cultivation in Britain (A Manual of Current Practice), by H. A. Cole, 45 pp., illus., printed, 5s. (70 U.S. cents). Her Majesty's Stationery Office, London, England, 1956. An attempt is made to give a straightforward account of the various methods of oyster culture at present followed in Britain and to indicate lines along which further development is possible. Although the work is particularly addressed to anyone comtemplating oyster farming, either on a large or small scale, and special attention is given to difficulties likely to be encountered, a full description is also given of those new techniques worked out at home or abroad, which are considered to be of value to British oyster planters. Contains chapters on suitable areas for development; sewage and industrial pollution; legal considerations; equipment and methods of cultivation; seasonal work on an oyster fishery; copper taints in oysters; the purchase of oysters for relaying and restocking; the making of new oyster beds and the reclamation of derelict grounds; frost; the cultivation of Portuguese oysters; and the food value of oysters.
- Partners in World Trade (The Goal of the GATT),
 Department of State Publication 5879, Commercial Policy Series 148, 19 pp., illus.,
 printed, 15 cents. Department of State, Washington, D. C. (For sale by the Superintendent

- of Documents, Government Printing Office, Washington 25, D. C.)
- (Philippines) Fisheries Statistics of the Philippines, 1953, illus., printed, Bureau of Fisheries, Manila, Philippines.
- "Pothead Roundup," by Mark Ronayne, article, Trade News, vol. 9, no. 3, September 1956, pp. 3-5, illus., printed. Department of Fisheries of Canada, Ottawa, Canada. Describes the most recent developments in the Newfoundland pothead whale fishery. The pothead whales are driven into a "corral" at New Harbour, from the outer areas of Trinity Bay where they are allowed to roam at will until they are selected for killing. This latest development phase is reflected in the rows of aluminum-covered sheds which nestle almost out of sight in fir and spruce stands along the road to Dildo. Once virgin forest, a large part of this area has been transformed almost overnight into a bustling mink-ranching center which provincial authorities are hopeful will some day develop into one of the continent's largest. They base these predictions on the abundance of pothead whales and codfish which, barring unforeseen and unlikely changes, can be expected to provide feed supplies for hordes of mink that nobody would dare estimate at this time.
- Progress Reports of the Pacific Coast Stations,
 No. 106, 28 pp., illus., printed. Fisheries
 Research Board of Canada, Ottawa, Canada,
 September 1956. Among the articles included
 are: Storage of Live Crabs in Refrigerated Sea
 Water," by S. W. Roach; "Effect of Chlortetracycline Treatment of Fish on Development
 of Certain Food-poisoning Bacteria," by H. M.
 Bluhm and H. I., A. Tarr; "Results of Tests
 on Kuralon Staple Twine," by P. J. G. Carrothers; "Distribution and Movement of Young
 Pacific Salmon During Early Ocean Residence,"
 by J. I. Manzer.
- "Quality of Sardines (Clupea pilchardus Walb.) Held Unfrozen and Frozen Prior to Canning," by W. A. MacCallum, W. J. Dyer, S. Curi, J. J. Simoncic, M. Kovacevic, D. C. Horne, R. J. McNeill, M. Drvaric, and H. Lisac, article, Food Technology (Published by the Institute of Food Technologists), vol. 10, no. 9, September 1956, pp. 432-438, illus., printed. The Garrard Press, 119 West Park Ave., Champaign, Ill. Gives the results of tests made on the quality of sardines, Clupea pilchardus, held unfrozen and frozen prior to canning. Prior to canning, the fresh chilled fish, the stored unfrozen fish, and the fish thawed after removal from frozen storage were examined organoleptically and peroxide determinations were made. The following tests of canned fish were made: (a) organoleptic examination; (b) determination of peroxide value; (c) determination of free fatty acids; and (d) determination of salt. The authors report the following conclusions and recommendations: "Sardines, to be of good canning quality, should be iced in boxes within two or three hours of catching in a manner which prevents crushing.

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Fish handled in this manner should be held no longer than three days in unfrozen storage prior to canning. Evisceration of sardines prior to storage is not necessary once these conditions are observed. After the sardines are cooled and placed in storage at 30° to 31° F. (-1.1 to -0.5 C.), the presence or absence of ice over the fish does not affect the quality of the fish for canning. Only strictly fresh sardines, iced and handled as specified, should be frozen for later canning. Glazed and unglazed air-frozen sardines can be held at a temperature of -4° F. (-20° C.) in a condition acceptable for canning for a period of up to one month. A storage temperature of about -20° F. (-29° C.) is recommended for use in commercial practice. Organoleptic examination of the fish meat both prior to and after canning is recommended to give a proper assessment of quality for canning.

"Quality Variables Pinpointed for Fish-Stick Makers," by Stephen J. Lirot and John T. R. Nickerson, article, <u>Food Engineering</u>, vol. 28, no. 6, June 1956, pp. 88-90, 189, illus, printed. McGraw-Hill Publishing Co., Inc., 330, 42nd St., New York 36, N. Y. Describes a study of the effect processing and coating ingredients have on the quality of frozen precooked fish sticks. Results show that: (1) there is a highly significant correlation between subjective color grading and spectrophotometer reflectance values in the red portion of the spectrum for sticks fried in oil, frozen, then defrosted and oven-heated for 15 minutes at 400° F. Further taste-panel scores indicate a preference for sticks with shades in the central portion of the range, neither too light nor too dark; (2) percent over-all breader and batter pickup of uncooked sticks appears to vary linearly with the logarithm of both batter viscosity and percent frying weight loss. The latter increases as over-all pickup decreases; (3) coating performance is greatly affected by the specific flour or flour combinations used in the batter; (4) above 3 percent, increasing concentrations of egg yolk solids in the batter reduces its viscosity and over-all pickup by uncooked sticks; and (5) compared with batter containing 3-percent egg solids, one with no egg solids produces slightly greater fat absorption and weight loss during frying. A concentration of less than 3-percent egg solids in batter mixtures may be desirable.

Report of the Food Investigation Board with the Report of the Director of Food Investigation for the Year 1955, 85 pp., printed, 4s. (56 U.S. cents). Her Majesty's Stationery Office, London, England, 1956. Contains, among others, a report concerning research work undertaken at the Torry Research Station, Aberdeen, and the Humber Laboratory, Hull. Discusses improvement in quality of iced white fish, freezing and cold storage, smoke curing, drying, fishery byproducts, bacteriology, and biochemistry. It mentions experiments with fish containers; electrostatic smoking of herring; smoke production and its control by means of a "fluidizer;" and the fact that the recording optical-density smokemeter (the Torry Smoke

meter) is now being manufactured commercially. The report states that, "it is believed this instrument will have wider application than in the smoke-curing of foods."

Revue des Travaux de L'Institut des Peches Maritimes (Review of the Studies of the Marine Fisheries Institute), vol. XX, no. 2, June 1956, pp. 119-220, illus., printed in French. Institut Scientifique et Technique des Peches Maritimes, 59 Avenue Raymond-Poincare, Paris 16, France. Includes articles on the study of the scallop (Chlamys varia L.); acclimatization of the clam (Venus mercenaria L.) to Britany; breeding of Portuguese oysters on rafts; and statistics on the French fisheries for 1954 by species and fishing area.

Scientists Stalk Oyster Killers, 16 pp., illus., printed. (Reprinted from The Humble Way a publication of the Humble Oil & Refining Co.) Humble Oil & Refining Co., Houston, Texas. Presents a brief history of oyster mortalities in different parts of the world; a description of a Louisiana oyster operation; contrasts in marketing; and environment and enemies of oysters. Also describes oyster research work to determine whether or not oil operations would contribute to oyster mortality. After many years of hard work, scientists working independently of each other, and representing divergent interests, have proved that the real oyster killer is a parasitic fungus which flourishes under conditions found most of the year in Louisiana waters. Scientists found that parasite, studied its devastating effect on oysters, and agree that it is the major cause of oyster mortality in Louisiana.

"Some Effects of Specific Organic Compounds on Marine Organisms," by Albert Collier, Sammy Ray, and W. B. Wilson, article, Science, vol. 124, no. 3214, August 1956, p. 220, printed, single copy 25 cents. American Association for the Advancement of Science, 1515 Massachusetts Ave., NW., Washington 5, D. C.

"Some Factors Affecting the Sodium Chloride Content of Haddock During Brine Freezing and Water Thawing," by J. Holston and S. R. Pottinger, article, Food Technology, vol. 8, no. 9, pp. 409-414, illus., printed, single copy \$1. The Garrard Press, 119 West Park Ave., Champaign, Ill.

"Spawning and Egg Production of Oysters and Clams," by H. C. Davis and P. E. Chanley, article, The Biological Bulletin, vol. 110, no. 2, April 1956, pp. 117-128, illus., printed, single copy \$2.50. Lancaster Press, Inc., Prince and Lemon Sts., Lancaster, Pa.

"Stranded Mammals of the Sea," article, The New York State Conservationist, vol. 11, no. 1, August-September 1956, pp. 4-5, illus., printed, single copy 50 cents. The Conservationist, Room 515, Arcade Bldg., Albany 1, N. Y.

Technical Report of Fishing Boat, No. 9, 232 pp., illus, printed in Japanese with brief English

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abstracts, Fishing Boat Laboratory, Production Division, Ministry of Agriculture and Forestry, Kasumigaseki, Chiyodaku, Tokyo, Japan, September 1956. Contains the following reports, with very brief abstracts in English, on various studies in progress at the Fishing Boat Laboratory: (1) "A Note of Fishing Boat Stability (Report No. 1, Medium Type Boat);" (2) "Study of Fish Hold Insulation Materials;" (3) "Wears of Cylinder of etc. Fishing Boat-IX (Effect on Temperature of Cooling Water No. 2);" (4) "Automatic Net-Height Meter Measuring Simultaneously Two Points of the Trawl Net, and Results of Experiments for these Apparatuses;" (5) "Study on Reflection Loss of Ultrasound Milimeter Wave on Fish-Body;" (6) "Study on Fish-Finder for Ground-Fish (Report No. 1 - Technical Examination and Experiment on Fish-Finder for Ground-Fish);" (7) "Study on Fish-Finder for Ground-Fish (Report No. 2 - Study on Finding of Ground-Fish by 50 kc. Fish-Finder);" (8)
"Study on Fish-Finder for Ground-Fish (Report No. 3 - Study on Detection of Ground-Fish by 200 kc. Fish-Finder);" (9) "Study of DSL by Ultrasonic Wave (2);" (10) "Investigation of Sea-Noise;" and (11) "Study on Measurement of Under-Water Noises at Kurihama Bay. " An appendix lists the reports published in the past, Nos. 1-8.

"Temperature Measurements on Frozen Fish During Road Transport," by D. L. Nichol and J. Lawrence, article, Modern Refrigeration, vol. LIX, no. 702, September 1956, pp. 316-319, illus., printed, 3s. (42 U.S. cents). Refrigeration House, Victoria Road, Woking Surrey, England. This paper is concerned with temperature measurements in a large road container operating under normal commercial conditions. The time/temperature relationship for the cold storage of white fish was established. Results of test indicate that a block of fish which has become heated from 0° F, to+15 F. over 24 hours, provided that it is returned to cold storage at 0° F, and cooled fairly rapidly, will only have suffered deterioration equivalent to about 3 days in storage. With the type of container described even this small deterioration represents the extreme case, that of the most exposed blocks during a journey in very hot weather. The effect upon the majority of the load will be very much less. With insulated containers of this type there is clearly no need to provide refrigeration in transit for journeys of up to 26 hours. The work, however, does indicate that if a refrigerated container were being designed (e.g. for longer journeys) it would be particularly necessary to provide cooling at the edges and corners of the load. Clearly the provision of refrigeration in the air spaces above the load whether by cooling coils or by the use of solid carbon dioxide would not be an efficient method of cooling the bottom edges and corners.

(Texas) Game and Fish Laws, 1955-1956, compiled by Erma Baker, 319 pp., printed. Game and Fish Commission, Austin. Texas, September 1, 1955. Contains the full text of the game, fish, and fur laws of Texas for 1955-1956. Two of its chapters are devoted to the (1) fresh-water fishing laws and (2) salt-water and commercial fishing laws.

"Underwater Observations on Escallop (Pecten maximus L.) Beds," by R. H. Baird and F. A. Gibson, article, Journal of the Marine Biological Association of the United Kingdom, vol. 35, no. 3, October 1956, pp. 555-562, illus., printed, single copy US\$7. Cambridge University Press, 32 East 57th St., New York 22, N. Y. This article describes the equipment and methods used in underwater observations of scallop beds, and the movement and distribution of scallops, and it gives a comparison of catches by diving and dredging. The authors state that, "Present methods of dredge sampling of escallop beds are unsatisfactory where all age-groups require to be studied. Selectivity by the dredge is continued above the point that might reasonably be expected from mesh size and tooth spacing, the latter being the primary selecting agent. A dredge without teeth and with a fine mesh bag fills with sand and bottom material within a short distance. As the mean density of escallops is low, even on good commercial beds, this results in very small catches. Escallops of all age-groups are present together on the beds with a tendency towards very localized age grouping, which would not be apparent in dredge sampling. There is no evidence that migration from feeder beds occurs. There is little apparent escape reaction; the limited reactions seen occurred most often among 0and 1-group escallops. Dredge efficiency is low, the Irish dredge used being on the bottom for only a part of the time that it was moving, progression occurring in a series of long shallow leaps. Conservation of stocks of escallops would be most effective if based on dredgetooth spacing and size rather than on the size of mesh or rings forming the belly of the dredge.

Utilizing Stock Tanks and Farm Ponds for Fish, by Marion Toole, Bulletin 24, 53 pp., illus., printed. Game and Fish Commission, Austin, Texas.

White Fish Authority, Fifth Annual Report and Accounts for the Year Ended 31st March, 1956, 51 pp., printed, 2s. (28 U.S. cents). Her Majesty's Stationery Office, London, England, Presents a general description of the White Fish Authority, its functions, income, and expenditures. Sections on production of fishery products, marketing and distribution, research and experiments, training courses, and investigations are also presented.

The World's Best Fishin' Hole, by J. L. McHugh, 8 pp., illus., printed. (Reprinted from the Bulletin of the International Oceanographic Foundation, vol. 1, no. 2, May 1955.) The Marine Laboratory, University of Miami, 439 Anastasia Avenue, Coral Gables 34, Fla. Briefly discusses fishing in the Chesapeake Bay giving special emphasis to: decline in commercial landings of croaker and gray sea trout; value of the oyster industry; abundant seafoods;

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Virginia Fisheries Laboratory activities; oyster disease studies; blue crab spawning probecauses of reduced shad and croaker catches; disappearance of the croaker; and ever-increasing sport fishery. The author states that "These are but a few of the fascinating problems the biologists have pledged themselves to solve. The quest will lead them to follow many trails. The answers should benefit not only Virginia, but may contribute to the welfare of the nation and the world. Whether or not it can honestly claim the title 'The world's best fishin' hole,' the Chesapeake is well on the way to getting the scientific attention it deserves."

World Sea Fisheries, by Robert Morgan, 307 pp., illus., printed. Pitman Publishing Corporation, 2 West 45th Street, New York 36, N.Y.; also London, England, 1956. This book describes the fisheries of the world on a rather comprehensive basis considering the scope of the subject and the fact there are only 292 pages of text. The limitation permits cover age of only the more important matters, with details left to the more specialized reports on the subject. The first of three sections -- Physical Environment -- discusses the physical conditions, the fisheries potential, the economically-important fish, and the coastal zones and their influence. The second--Techniques and their World Distribution -- covers fishing methods and craft used in demersal fishing, processing and transporation, and fishing ports. The third--Fisheries of the World's Regions -- handles the subject by continents and the more significant areas within them after setting up evaluating criteria. These include technical development in terms of craft, gear, processing methods, degree of crailable resources, etc.; total production; and the importance of the fisheries to the domestic economy. The final chapter discusses future possibilities with respect to fish farming, international agreements, and improved catching, processing, and distributing techniques. An appendix brings summarized production by countries up through 1953, and there is a 13-page index. Sixteen halftone plates and 61 figures help to clarify the text, and most chapters end with a list of references to specialized reports.

-- A. W. Anderson

TRADE LIST

The Office of Intelligence and Services, Bureau of Foreign Commerce, U. S. Department of Commerce, Washington 25, D. C., has published the following trade list. Copies of this list may be obtained by firms in the United States from that office or from Department of Commerce field offices at \$2 a list.

Canneries - Japan, 16 pp. (October 1956). The canned foods industry of Japan consists of 450 canners, half of which specialize in canned marine products. The pack of canned foods included more than 9. 9 million cases (48 cans) of canned marine products in 1955 amounted to 62,200 metric tons, valued at US\$45,7 million. The list includes all known canners at the time of publication, but is subject to change without notice. The name of the cannery, address, branch offices, products canned, annual production, and daily productive capacities are some of the data included in the list.

CORRECTION

In the July 1956 issue of Commercial Fisheries Review, page 109, the listing of the publication Laxfisket och Laxbestandet i Ostersjoomradet Under Senare Ar (The Salmon Catch and the Salmon Stock in the Baltic during Recent Years) incorrectly showed two authors. Only one author should have been shown: Dr. Gunnar Alm.



Editorial Assistant -- Ruth V. Keefe

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* * * * *

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PREPARATION, FREEZING, AND COLD STORAGE OF FISH, SHELLFISH, AND PRECOOKED FISHERY PRODUCTS

Fishery Leaflet 430 (<u>Refrigeration of Fish - Part 4</u>, "Preparation, Freezing, and Cold Storage of Fish, Shellfish, and Precooked Fishery Products"), is one of a series of five leaflets on the refrigeration of fish. This leaflet deals in detail



with the various processing and freezing operations developed by the widely-diversified fishing industry. Section one of the leaflet takes up the preparation of fish for the markets as practiced in various sections of the United States. Section 2 deals with shellfish and the processing required for each marketed form. Section 3 includes similar details on such rapidly-growing "heat and serve" or "ready-to-eat" fishery products as breaded shrimp, fish sticks, and many others.

Coated raw fish sticks leaving breader machine enter right-angle conveyor belt and are carried to the continuous cooker, Girl at left is examining breaded product for possible defects,

In addition to Part 4 of this series, Part 3, "Factors to be Considered in the Freezing and

Cold Storage of Fishery Products"--Fishery Leaflet 429--has been released and both leaflets may be obtained free from the Division of Information, U. S. Fish and Wildlife Service, Washington 25, D. C.



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COMMERCIAL DEVIEW FISHERIES NEVIEW

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-Volume 18-

FISH and WILDLIFE SERVICE United States Department of the Interior Washington, D.C.



COMMERCIAL FISHERIES REVIEW



A review of developments and news of the fishery industries prepared in the BRANCH OF COMMERCIAL FISHERIES

A. W. Anderson, Editor

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Mailed free to members of the fishery and allied industries. Address correspondence and requests to the: Director, Fish and Wildlife Service, U.S. Department of the Interior, Washington 25, D.C.

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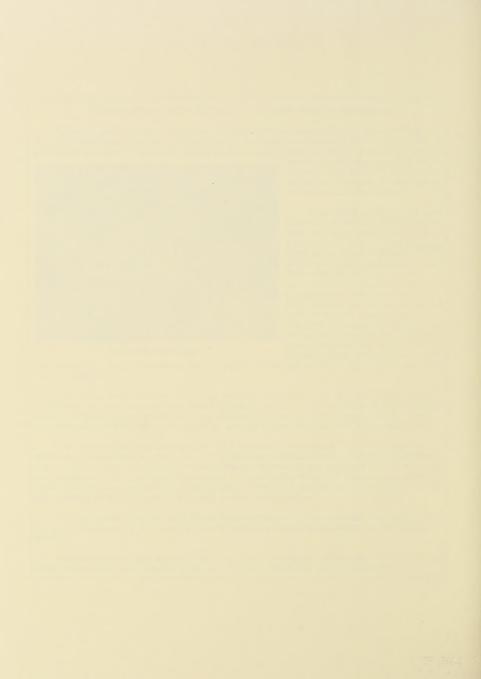
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The recipe book is for sale by the Superintendent of Documents, Washington 25, D. C. The price is 15 cents with a 25-percent discount on orders of 100 copies or more.

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